

**CALIFORNIA ENERGY COMMISSION**

1516 NINTH STREET  
SACRAMENTO, CA 95814-5512



The staff of the California Energy Commission hereby submits its Final Staff Assessment (FSA) for the proposed Potrero Unit 7 Project, a 540-megawatt, natural gas-fired, combined-cycle electric generation facility proposed to be located in the City and County of San Francisco at the existing Potrero Power Plant that is owned by the applicant, Mirant. This document contains our testimony for the upcoming evidentiary hearings of the Energy Commission that are expected to start in late-March or April 2002. It is staff's responsibility to complete an independent assessment of the project's potentially significant effects on the environment, public health and safety, and whether it conforms to applicable legal requirements. This assessment also includes recommended conditions of certification to mitigate potential effects of the project.

**The FSA contains a preliminary Local Systems Effects analysis that is new since the Preliminary Staff Assessment was issued in May 2002. Staff invites comments on this draft and requests that they be provided to the Energy Commission's project manager, Marc Pryor, either by mail or by email [m Pryor@energy.state.ca.us] no later than February 27, 2002. Staff will consider the comments and would expect to issue a final LSE by March 11, 2002.**

Persons wanting information on how to participate in the Energy Commission's hearings should contact Ms. Roberta Mendonca, the Energy Commission's Public Adviser, at (916) 654-4489, or (800) 822-6228. Technical or project schedule questions should be directed to Marc Pryor, Energy Commission Project Manager, at (916) 653-0159. News media inquiries should be directed to Assistant Executive Director, Claudia Chandler, at (916) 654-4989.

**POTRERO POWER PLANT UNIT 7 PROJECT (00 AFC 4)  
FINAL STAFF ASSESSMENT**

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# EXECUTIVE SUMMARY

## INTRODUCTION

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Mirant proposes to construct and operate the Potrero Power Plant Unit 7 Project (Unit 7) as an expansion to its existing Potrero Power Plant that is located on the eastern shore of the City and County of San Francisco. Mirant filed an Application for Certification (AFC) on May 31, 2000, and the AFC was accepted on October 11, 2000. This action by the Energy Commission initiated staff's independent analysis of the proposed project.

It is the responsibility of the Energy Commission staff to complete an independent assessment of the project's potential effects on the environment, the public's health and safety, and whether the project conforms with all applicable laws, ordinances, regulations and standards (LORS). The staff also recommends measures, referred to as conditions of certification, to mitigate potential significant adverse environmental effects and conditions for construction, operation and eventual closure of the project.

This Final Staff Assessment (FSA) contains staff's analysis and recommendations on the Unit 7 project, a nominal 540-Megawatt (MW) electrical power generation facility. It reflects changes to the Preliminary Staff Assessment (PSA) that was issued on May 31, 2001. The changes to the PSA are a result of further analysis and additional information obtained from different sources, and comments on the PSA that were received from the public, other agencies, intervenors and the applicant. (See the Response to Comments section of this FSA.)

The FSA serves as staff's testimony. It is not a decision document in these proceedings, nor does it contain findings of the Energy Commission related to either environmental impacts or the project's compliance with local/state/federal legal requirements. The California Energy Commission will make the final decision, including findings, after completion of evidentiary hearings. The Committee will hold evidentiary hearings and will consider the recommendations presented by staff, the applicant, all parties, government agencies, and the public prior to proposing its decision.

The Unit 7 project and related facilities such as the electric transmission lines, water supply lines and wastewater lines, are subject to the Energy Commission's license. When issuing a license, the Energy Commission acts as lead state agency under the California Environmental Quality Act (CEQA), and its process is certified by the State Resources Agency as a separate program that satisfies the core CEQA requirements.

## LOCAL SYSTEM EFFECTS

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The FSA contains a draft Local Systems Effects (LSE) analysis that is new since the Preliminary Staff Assessment was issued in May 2002. Staff invites comments on this draft and requests that they are provided to the Energy Commission's project manager, Marc Pryor, either by mail or by email [mpyor@energy.state.ca.us] no later than February 25, 2002. Staff will consider the comments and would expect to issue a final LSE by March 11, 2002.

## **PUBLIC WORKSHOPS AND AGENCY COORDINATION**

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Staff has conducted ten public workshops in San Francisco. Five workshops were held prior to the PSA, four in June addressed the PSA, and the tenth was a workshop on Environmental Justice that was held in August 2001. In addition, two aquatic biology teleconferences were held in Sacramento prior to the completion of the PSA. These teleconferences were noticed and open to the public.

Several of the workshops and teleconferences were attended by local, state and federal agencies including, but not limited to: the City and County of San Francisco (CCSF), Bay Area Air Quality Management District (BAAQMD), California Department of Fish and Game (CDFG), and National Marine Fisheries Service (NMFS). These workshops and teleconferences have been held by staff to understand the issues and concerns of the public, intervenors, agencies, and the applicant. Many helpful comments were received during these events.

In addition to these workshops and teleconferences, extensive coordination has occurred with the numerous local, state and federal agencies that have an interest in the project. Energy Commission staff has worked with the California Independent System Operator (Cal-ISO), California Air Resources Board (CARB), U.S. Environmental Protection Agency (USEPA), San Francisco Bay Regional Water Quality Control Board (SFRWQCB) and California Department of Fish and Game (CDFG), and others to identify and resolve issues of concern.

Written comments on the PSA have been taken into consideration in the FSA, where appropriate. Staff provided responses to comments received from members of the public, other agencies, and the City and County of San Francisco.

## **ENVIRONMENTAL JUSTICE**

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Staff has considered an environmental justice implications for the proposed Potrero Unit 7 project. For guidance it has relied on documents from the USEPA. Staff's emphasis includes broad outreach, demographic analysis, impact analysis, and where necessary, analysis of impact proportionality.

The population within the "affected area" for the project (a six-mile radius) includes a 57 percent nonwhite population. This triggered the need to consider environmental justice implications of the project for eleven specific technical areas. These areas are: socioeconomics (demographics), air quality, public health, hazardous materials handling, noise, waste management, water resources, visual, transmission line safety and nuisance, traffic and transportation, and land use.

On April 12, 2001, Energy Commission staff held an environmental justice outreach meeting in Potrero Hill to explain the three primary components of staff's environmental justice analysis: demographics, public outreach, and impacts assessment. Meeting notices were mailed to the Proof of Service (POS) list, the general mailing list, and to all known community organization representatives. In addition, the Commission Public Adviser's Office sent flyers of the meeting to local public schools. Staff held a second

environmental justice meeting in the Potrero Hill neighborhood on August 2, 2001, to discuss staff's Preliminary Staff Assessment, including the areas of air quality, public health, land use, water resources, hazardous materials, and demographics. Meeting notices were distributed to the POS and project mailing lists, and in addition door-to-door in the Potrero Hill Housing Development.

## CONCLUSIONS

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Each technical area in the FSA includes an analysis of the project and the existing environmental setting; the project's conformance with laws, ordinances, regulations and standards (LORS) and whether the facility can be constructed and operated safely and reliably. Staff assessed the environmental consequences of the project using the mitigation measures proposed by the applicant, and recommends conditions of certification for the construction and operation of the plant, if approved by the Energy Commission.

Except for the following items, the proposed project does not significantly affect public health and safety, the transmission system, and the environment, and complies with all laws, ordinances, regulations and standards. The impacts are:

1. The applicant's proposed mitigation for air quality impacts does not include local mitigation measures.

In the area of most concern to the public, air quality, staff concluded that the impact of the project was significant and recommends mitigation beyond any that would be required by air regulators or other governmental entities. Therefore, staff proposes mitigation that would reduce diesel emissions from buses and trucks in the Potrero area. This would have tangible local benefits with regard to human health. Diesel emissions are acknowledged to be toxic and could have serious effects on public health. Moreover, vehicle emissions are at the ground level, where they are most likely to be inhaled before they are dispersed and diluted.

2. The proposed project's once-through cooling system would cause potentially significant environmental impacts to aquatic biological resources. In addition, it is questionable whether the project, as proposed, would comply with state law regarding Bay fill and federal Endangered Species Act regulations.

To avoid these two impacts, staff has studied alternative power plant cooling technologies that would not use Bay waters for cooling, and believes that a hybrid ("wet-dry") system is the most feasible alternative.

3. Staff agrees with the applicant that demolition of two structures, the Meter and Compressor Houses, would be significant impacts.

Staff's preferred mitigation would be relocation of the two historic buildings to a nearby vacant property. This mitigation would reduce the impact to less than significant. Although staff has ascertained that it is feasible to move the buildings, at this time there is no surety that one or more nearby parcels of vacant land could be the permanent

home for these buildings. Staff will continue to pursue this option. In the event that by the hearings feasibility is not assured, staff proposes recordation and a display kiosk as partial mitigation. This will require a CEQA override finding by the Energy Commission.

## **POWER PLANT COOLING**

The applicant proposes to utilize waters from San Francisco Bay for power plant cooling using a once-through system. The proposed use of once-through cooling creates potentially significant impacts on aquatic biological resources that may not be mitigable.

This impact results in part from the “entrainment” of species in the large volume of water that the project requires for “once through” cooling. “Entrainment” refers to the varied species, from plankton to small fish, that would be circulated with the cooling water through the project cooling system and destroyed as a result. The San Francisco Bay is a delicate environmental resource with a legacy of abuse. Recovery of this impaired water body and its ecosystem will be hindered by this additional burden.

Use of once-through cooling also entails a high degree of regulatory uncertainty. The San Francisco Bay Conservation and Development Commission (BCDC) is required to report to the Energy Commission its recommendations regarding measures to avoid the impacts of “bayfill”, including the water intake and outlet structures. Should BCDC ultimately recommend an “upland” (non-bayfill) alternative to once-through cooling, the Energy Commission could only license a project with once-through cooling if it found the upland alternative to have greater comparable environmental impacts or that alternatives to fill were infeasible.

In addition, USEPA has recently issued new regulations for intake and outfall structures that may apply to the NPDES permit issued by the Regional Water Quality Control Board for all “new facilities”. USEPA Region 9 formally stated in December 2001 that the stringent new regulations apply to the project, declaring it a “new facility”. USEPA’s Washington, D.C. office has since countermanded the prior letter, but it remains unclear as to when and how this issue will be definitively resolved. Staff believes these regulatory uncertainties, coupled with impacts on aquatic resources, make an upland alternative cooling system highly preferable to the project as proposed.

Staff has analyzed three upland cooling technology alternatives that would not use Bay waters for power plant cooling - wet cooling, hybrid (wet/dry) cooling, and dry cooling - in an appendix to the Aquatic Biological Resources section. Staff concludes that both the hybrid and dry cooling alternatives are feasible. However, use of hybrid technology is preferred due to space constraints, potentially significant adverse visual impacts associated with the dry cooling alternative, and the availability of reclaimed water from the City’s Southeast Water Treatment Plant located about one mile from the Potrero Power Plant site. Use of reclaimed water would benefit the City by reducing the quantities of treated water discharged to the Bay as part of its operations of the treatment plant.

## **COMPLIANCE WITH LAWS, ORDINANCES, REGULATIONS, AND STANDARDS (LORS)**

The project complies with all applicable LORS, with two possible and important exceptions. First, as discussed above, it is not clear whether the proposed project would comply with BCDC statutes regarding fill. Second, the applicability of the federal Clean Water Act (CWA) 316(b) regulations is neither completely resolved, nor is it known how such resolution will occur.

In addition, staff anticipates that USEPA will initiate formal Endangered Species Act (ESA) consultation with National Marine Fisheries Service (NMFS). If so, the process will be: 1) NMFS must express to USEPA its belief that the proposed project will impact Endangered Species Act listed species (salmonids), 2) USEPA would need to agree, 3) USEPA would either request information from the applicant that would allow it (USEPA) to prepare a Biological Assessment (or more likely, the applicant would provide a Biological Assessment to USEPA), 4) USEPA would then initiate CWA section 7 consultation with NMFS by forwarding the Biological Assessment. Once the submission is found complete, which may take more than one iteration, NMFS would have at least 135 days to complete a Biological Opinion.

Finally, the City and County of San Francisco adopted an ordinance (the “Maxwell” ordinance) in 2000 “...requiring all City officials and departments to advocate these requirements . . . in regulatory proceedings and negotiations regarding [Potrero Unit 7] and requiring approval of the Board of Supervisors for any agreement by City officials or departments for new electric generation in Southeast San Francisco.” The ordinance goes on to include findings with regard to the health of the nearby population and policies or conditions for the City’s approval of Potrero Unit 7. While the Maxwell ordinance is certainly an important pronouncement of what the City believes should be required for its approval of the project, its directives are internal, and apply to the City’s own officials and departments. For instance, it would appear on its face to be binding on the City’s Port Authority, which the City asserts must grant some entitlement to Mirant to replace existing water intakes and outlets with new ones. However, because the ordinance is essentially a directive to its own officials, staff does not believe that it is a LORS in the ordinary meaning of the term, and does not believe that override findings are required if the project is licensed without complete accord with all of its provisions.

## **BENEFITS OF THE UNIT 7 PROJECT TO SAN FRANCISCO**

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Unique circumstances surround power generation and supply to the San Francisco Peninsula. Local generation by the existing Potrero and Hunters Point Power Plants are inadequate to provide reliable service to the City. The Potrero and Hunters Point Power Plants are quite old and increasingly unreliable, their air pollution emissions are high, and they are severely constrained by air quality permit limitations regarding the number of hours they can operate. The additional supply the City needs is provided by a limited capacity of transmission capacity coming up the San Francisco Peninsula. Thus, the City relies heavily on out-of-area generation, making it vulnerable to non-local natural and man-made disasters that could disrupt transmission service. New generation is needed to bolster reliability and to end reliance on power plants that often are not available because they break down or are limited by environmental concerns.

Energy Commission staff and the Cal-ISO have completed an analysis of the local electric transmission system effects of the project. This analysis concludes that the project will provide substantial electrical system benefits. These benefits are described below. (Please see the Local System Effects section for a full discussion.)

1. Unit 7 will displace significant transmission upgrades that would be required to maintain reliability if Hunters Point Power Plant is retired without the addition of generation in San Francisco. Unit 7 represents a significant source of real and reactive power to serve loads in the immediate San Francisco Peninsula Area; such resources substantially reduce the need to import power over already-stressed transmission facilities. Note that, if Hunters Point Power Plant is retired once Unit 7 is added, the addition of Unit 7 would not lead to the deferral of any currently planned transmission facilities, instead, Unit 7 offsets the need for *other additional* future transmission reinforcements (beyond those already in the transmission plan).
2. The addition of Unit 7 will substantially reduce transmission system losses. Over 20 years, the savings to ratepayers have a present value at between \$55 million and \$80 million. As well as reducing the cost of producing power in California, these loss savings would also contribute to a related decrease in the use of fossil fuels, water, and the production of air emissions by reducing the need for additional generation resources.
3. A primary benefit of the addition of Unit 7 is that it would add generation that is more reliable than the generation that is currently in place in the San Francisco Peninsula. Because of their advanced ages, existing generating plants on San Francisco Peninsula are unreliable and it is uncertain how much longer they can continue to operate. Moreover, the units are either run-time limited or de-rated (in terms of maximum output) due to emission output limitations and will likely require further upgrades to remain in operation in coming years.
4. Unit 7's additional generation will provide greater flexibility within the Bay Area for the Cal-ISO, PG&E, and generation owners to schedule maintenance on transmission facilities and generating units. Also, during periods of high demand, Unit 7 will provide critically needed margin and the flexibility to manage adverse and unexpected conditions.
5. Unit 7 can be connected to the ISO controlled grid with the projects identified in the current transmission plan and several system protection schemes.

## RECOMMENDATION

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Staff recommends that the Energy Commission license the Potrero Power Plant Unit 7 Project with mitigation, including replacement of the proposed once-through cooling system with an alternative cooling system and mitigation to reduce local diesel emissions from buses and trucks. The Unit 7 project will serve an important public purpose in helping secure a reliable energy supply for the upper San Francisco peninsula, and will help provide for the timely shutdown of the Hunters Point Power



Plant. Staff's proposed mitigation measures are needed to reduce or avoid local and regional air quality impacts, aquatic biological impacts, thermal impacts, and impacts to historical structures.

If the applicant continues with its current proposal to use a once-through power plant cooling system that utilizes water from San Francisco Bay, staff would not support approval of the project. Use of once-through cooling would result in potentially significant impacts to aquatic biological resources, and it also faces significant regulatory uncertainty from both federal and state law requirements regarding such impacts that is likely to delay implementation of the project. To avoid these potentially significant impacts and likely regulatory delays, staff recommends that the license require the project to use an alternative cooling system that avoids use of the Bay for cooling water. Staff has identified hybrid (wet/dry) cooling using reclaimed water from the City's wastewater treatment plant as a feasible upland alternative to once-through cooling.

The applicant may elect to pursue a different upland cooling alternative. Whether hybrid cooling, dry cooling, or some other form of cooling is chosen, some additional analyses will be necessary to analyze impacts associated with that alternative. However, in staff's view the switch to an alternative cooling method will avoid entirely both a potentially significant environmental impact, and the regulatory uncertainty and delays that will result from the applicant's proposal to use once through cooling.

# INTRODUCTION

The applicant, Mirant, proposes to construct and operate the Potrero Power Plant Unit 7 Project (Unit 7) as an expansion to its existing Potrero Power Plant that is located on the eastern shore of the City and County of San Francisco. Mirant filed an Application for Certification (AFC) on May 31, 2000, seeking approval from the Energy Commission. The AFC was accepted on October 11, 2000. This action by the Energy Commission initiated staff's independent analysis of the proposed project.

It is the responsibility of the Energy Commission staff to complete an independent assessment of the project's potential effects on the environment, the public's health and safety, and whether the project conforms with all applicable laws, ordinances, regulations and standards (LORS). The staff also recommends measures, referred to as conditions of certification, to mitigate potential significant adverse environmental effects and conditions for construction, operation and eventual closure of the project.

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The Unit 7 project and related facilities such as the electric transmission lines, water supply lines and wastewater lines, are under the Energy Commission's jurisdiction. When issuing a license, the Energy Commission acts as lead state agency under the California Environmental Quality Act (CEQA), and its process is certified by the State Resources Agency as a separate program that satisfies the core CEQA requirements.

## ORGANIZATION OF THE REPORT

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The FSA describes the following:

- the proposed project;
- the existing environmental setting;
- whether the facilities can be constructed and operated safely and reliably in accordance with applicable laws, ordinances, regulations and standards (LORS);

- the environmental consequences of the project, including potential public health and safety impacts;
- cumulative analysis of the potential impacts of the project, along with potential impacts from other existing and known planned developments;
- mitigation measures proposed by the applicant, staff, interested agencies and intervenors that may lessen or eliminate potential direct and cumulative impacts;
- proposed conditions under which the project should be constructed and operated, if it is certified; and
- project alternatives.

The analyses contained in this FSA are based upon information from: 1) the AFC; 2) supplements and amendments to the AFC; 3) responses to data requests; 4) local, state and federal agencies; 5) concerned citizens; 6) existing documents and publications; 7) independent field studies and research; and 7) comments on staff's Preliminary Staff Assessment (PSA) that were by other parties<sup>1</sup>, the general public and non-intervenor public agencies. The FSA presents recommended conclusions and, for most technical sections, proposed conditions of certification that apply to the design, construction, operation and closure of the proposed facility. Each proposed condition of certification is followed by a proposed means of "verification". The verification is the Energy Commission Compliance Unit's method of ensuring post-certification compliance with adopted requirements.

The FSA contains an Executive Summary, Introduction, Project Description, a discussion of Need Conformance, and Project Alternatives. The environmental, engineering, and public health and safety analysis of the proposed project is contained in 20 technical areas. Each technical area is included in a separate chapter and are as follows: Air Quality, Public Health, Worker Safety and Fire Protection, Transmission Line Safety, Hazardous Material Management, Waste Management, Land Use, Traffic and Transportation, Noise, Visual Resources, Cultural Resources, Socioeconomic Resources, Aquatic Biological Resources (including an appendix that presents power plant cooling alternatives), Terrestrial Biological Resources, Soil and Water Resources, Geology and Paleontology, Facility Design, Reliability, Efficiency, and Transmission System Engineering and Local System Effects. These chapters are followed by a discussion of facility closure, project construction and operation compliance monitoring plans, and a list of staff that assisted in preparing this report.

Each of the 21 technical area assessments includes a discussion of:

- laws, ordinances, regulations and standards (LORS);
- the regional and site-specific setting;
- project specific and cumulative impacts;

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<sup>1</sup> As of January 31, 2002, the intervenors are: City and County of San Francisco (CCSF), Communities for a Better Environment (CBE), Southeast Alliance for Environmental Justice (SAEJ), Our Children's Earth Foundation (OCE), Californians for Renewable Energy (CARE), Potrero Boosters Neighborhood Association (PBNA), Dogpatch Neighborhood Association (DNA), and Coalition for Fair Employment in Construction (CFEC).

- mitigation measures;
- closure requirements;
- conclusions and recommendations; and
- conditions of certification for both construction and operation (if applicable).

Disproportionate Impacts (Environmental Justice) issues are discussed in the following sections: Socioeconomics, Air Quality, Public Health, Hazardous Materials Management, Noise, Waste Management, Water Resources, Visual Resources, Transmission Line Safety & Nuisance, Traffic & Transportation and Land Use.

## **ENERGY COMMISSION SITING PROCESS**

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The California Energy Commission has the exclusive authority to certify the construction and operation of thermal electric power plants 50 megawatts (MW) or larger. The Energy Commission certification is in lieu of any permit required by state, regional, or local agencies, and federal agencies to the extent permitted by federal law (Pub. Resources Code, section 25500). The Energy Commission must review AFCs to assess potential environmental impacts including potential impacts to public health and safety, potential measures to mitigate those impacts (Pub. Resources Code, section 25519), and compliance with applicable governmental laws or standards (Pub. Resources Code, section 25523 (d)).

The Energy Commission's siting regulations require staff to independently review the AFC and assess whether the list of environmental impacts contained is complete, and whether additional or more effective mitigation measures are necessary, feasible and available (Cal. Code Regs., tit. 20, sections 1742 and 1742.5(a)).

In addition, staff must assess the completeness and adequacy of the health and safety standards, and the reliability of power plant operations (Cal. Code Regs., tit. 20, section 1743(b)). Staff is required to develop a compliance plan (coordinated with other agencies) to ensure that applicable laws, ordinances, regulations and standards are met (Cal. Code Regs., tit. 20, section 1744(b)).

Staff conducts its environmental analysis in accordance with the requirements of the California Environmental Quality Act (CEQA). An Environmental Impact Report (EIR) is not required as the Energy Commission's site certification program has been certified by the Resources Agency (Public Resource Code, section 21080.5 and Cal. Code Regs. tit. 14, section 15251 (k)). The Energy Commission acts in the role of the CEQA lead agency and is subject to all other portions of CEQA.

The FSA is only one piece of evidence that will be considered by the Committee (two commissioners who have been assigned to a specific project) in reaching a decision on whether or not to recommend that the full Energy Commission approve the proposed project. At the publicly-noticed evidentiary hearings all parties will be afforded an opportunity to present evidence, cross examine witnesses, and to rebut the testimony of other parties, thereby creating an evidentiary hearing record on which a decision on the project can be based. The hearing before the Committee also allows all parties to

argue their positions on disputed matters, and it provides a forum for the Committee to receive comments from the public and other governmental agencies.

Following the hearings, the Committee's recommendation to the Energy Commission on whether or not to approve the proposed project will be contained in a document entitled the Presiding Members' Proposed Decision (PMPD). Following publication, the PMPD is distributed in order to receive written public comments. At the conclusion of the comment period, the Committee may prepare a revised PMPD. A revised PMPD is required to undergo a 15-day comment period. At the close of the comment period for the revised PMPD, the PMPD is submitted to the full Energy Commission for a decision. Within 30 days of the Energy Commission decision, any party may appeal the decision to the Energy Commission.

A Compliance Monitoring Plan and General Conditions will be assembled from conditions contained in the FSA and other evidence presented at the hearings. The Compliance Monitoring Plan and General Conditions will be presented in the PMPD. The Energy Commission staff's implementation of the plan ensures that a certified facility is constructed, operated, and closed in compliance with the conditions adopted by the Energy Commission.

## **PUBLIC AND AGENCY COORDINATION**

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Staff has conducted ten public workshops in San Francisco. Five workshops were held prior to the PSA, four in June addressed the PSA, and the tenth was a workshop on Environmental Justice that was held in August 2001. In addition, two aquatic biology teleconferences were held in Sacramento prior to the completion of the PSA. These teleconferences were noticed and open to the public.

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information, see the **Responses to Public and Agency Comments on the PSA** section.

## **LOCAL SYSTEM EFFECTS**

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# PROJECT DESCRIPTION

Marc Pryor and Kevin Kennedy, Ph. D.

## INTRODUCTION

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The applicant, Mirant, proposes to construct and operate the Potrero Power Plant Unit 7 Project (Unit 7) as an expansion to its existing Potrero Power Plant that is located on the eastern shore of the City and County of San Francisco. Mirant filed an Application for Certification (AFC) on May 31, 2000, seeking approval from the Energy Commission. The AFC was accepted on October 11, 2000. This action by the Energy Commission initiated staff's independent analysis of the proposed project.

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## DESCRIPTION

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### GENERAL

Unit 7 would be operated as a merchant power facility. Electric output and operational levels would vary according to demand in the deregulated California energy market. Electricity prices and operational levels would not be subject to California Public Utilities Commission (CPUC) regulation. Mirant expects the Unit 7 project to cost between \$260 and \$320 million and to be operational within two years of approval by the Energy Commission.

### LOCATION

The proposed Unit 7 project would be located at the existing Potrero Power Plant site, on the Eastern Shore of the City and County of San Francisco. This site lies approximately mid-way between Hunters Point (about two miles to the south) and the San Francisco side of the San Francisco-Oakland Bay Bridge (about two miles to the north). (See PROJECT DESCRIPTION Figures 1 and 2.) Located on fill materials that been in place for many decades, the Potrero Power Plant is within an industrial setting that features different uses, including the San Francisco Drydock, Company, the last remaining large commercial dry-dock in the western United States. (See the **Land Use** and **Cultural Resources** sections for more detailed information on setting and history.)

### POWER PLANT

#### Existing Power Plant

The existing Potrero Power Plant is one of two power plants in California that are required to maintain dual-fueled capabilities by the California Independent System Operator (Cal-ISO).

Major existing site features include:

- Unit 3, a 206-MW, steam turbine generator that has dual-fuel capabilities, natural gas and Bunker C fuel oil. Its normal, and current, mode of operation is natural gas-firing. Conversion of Unit 3 to use Bunker C should it be required due to partial or full loss of other generation and/or transmission sources, would take approximately 10 days. Unit 3 features a once-through power plant cooling system comprised of intake/outfall structures (Harrer/Lee 2002). These structures would be replaced by new intake/discharge systems as a part of the Unit 7 project.
- Three distillate-fired 52-MW peaking units, Units 4, 5 and 6 (totaling 156-MW).
- Three fuel tanks. Tanks Numbers 3 and 4 are filled with Bunker C fuel oil for emergency operation of Unit 3 should natural gas service be interrupted. Tank Number 5 holds the distillate fuel for the peaking Units 4, 5 and 6.
- Station A Complex: turbine room, pump house and gate house.
- Gas plant structures: Meter House and Compressor House.

(See PROJECT DESCRIPTION Figures 3 and 4.)

## **Proposed Project**

### **Unit 7**

Proposed to be located in west-center portion of the site where the existing turbine building stands, the proposed Unit 7 would be a nominal 540-MW natural gas-fired, combined cycle power generating facility. Unit 7 would feature two Combustion Turbine Generators (CTGs) and one Steam Turbine Generator (STG). Heat generated from each CTG (a combustion cycle) will flow through a separate Heat Recovery Steam Generator (HRSG) where steam will be produced, which will be used to drive the STG (a steam cycle). This two CTG/HRSG and one STG set up is referred to as a “two-on-one combined-cycle configuration. (PROJECT DESCRIPTION, Figures 5, 6 and 7.)

Pollution controls on each CTG/HRSG “train” will include a Selective Catalytic Reduction (SCR) system to control the emissions of oxides of nitrogen (NOx), and a CO catalyst to control carbon monoxide emissions. Aqueous ammonia will be used as the reagent in Unit 7’s SCR system. Deliveries will be made by tanker trucks and stored in two new and identical, 20,000-gallon aboveground storage tanks. One tank will be used for Unit 7; with the second tank provided for the Unit 3 SCR retrofit, which is required for compliance with Bay Area Air Quality Management District regulations.

### **Natural Gas Fuel Supply**

The existing Potrero site’s PG&E natural gas supply will fuel the proposed Unit 7. A pipe tie-in will be made to the gas distribution line and this service will be connected to a compressor station that will be part of Unit 7.

### **Power Plant Cooling**

The applicant proposes to use San Francisco Bay water for circulating power plant cooling purposes at the rate of 158,000 gallons per minute (228 million gallons per day).



New water intake structure and discharge systems will be constructed at the shoreline, and would provide cooling water for both Units 3 and 7. As noted above, Unit 3's existing intake and outfall systems would be replaced with the new system. Discharged circulating cooling water will be returned to the bay via four pipes equipped with diffusion heads that will be located about 900 feet offshore from the plant site. Unit 3's set of discharge pipes will enter the bay near that unit, and the pipes for Unit 7 will enter the bay at the southeast corner of the property. (PROJECT DESCRIPTION Figure 8 through 10.)

Water supplied by the City of San Francisco's system will be used for the replacement, or "makeup", of water used in the steam production process, evaporative coolers, as well as for wash water and potable water. The combined rate of consumption of this water will be about 50 gallons per minute (72,000 gallons per day).

### **Transmission System**

Interconnection with the state's high voltage transmission system would be through a proposed new Potrero Power Plant Switchyard, located onsite, and to two existing PG&E substations. These would be a direct interconnection to PG&E's Potrero Substation adjacent to the Potrero Power Plant, and a separate underground interconnection to the Hunters Point Substation located approximately 1.8 miles to the south of the Potrero Power Plant site. (PROJECT DESCRIPTION Figure 2.)

### **Demolition of Existing Structures**

In the January 19 and 31, 2001 amendments to the AFC the applicant brought the demolition of six existing structures into the project. The Station A Complex (turbine room, pump house and gate house) and the compressor house were originally slated to be removed under permits issued by the CCSF, but due to urgings by the CCSF and delays, demolition was included in the Energy Commission's process. (PROJECT DESCRIPTION Figure 11 shows the six structures.) (SECAL 2001a and b.)

**PROJECT DESCRIPTION Figure 1**  
**Potrero Power Plant Unit 7 Project**  
**Regional Location**

**PROJECT DESCRIPTION Figure 2**  
**Potrero Power Plant Unit 7 Project**  
**Local Map**  
**(URS 5/24/00 Figure 2-11)**

**PROJECT DESCRIPTION Figure 3**  
**Potrero Power Plant Unit 7 Project**  
**Photo of Existing Plant Site**  
**(URS 5/23/00 Figure 1-2)**

**PROJECT DESCRIPTION Figure 4  
Potrero Power Plant Unit 7 Project  
Existing Facility Layout without the Proposed Unit 7  
(URS 4/27/01 Figure 2A)**

**PROJECT DESCRIPTION Figure 5**  
**Potrero Power Plant Unit 7 Project**  
**Photo Simulation of the Plant Site with the Proposed Unit 7**  
**(URS 4/19/01 Revised Figure 1-3)**

**PROJECT DESCRIPTION Figure 6  
Potrero Power Plant Unit 7 Project  
Facility Layout with the Proposed Unit 7  
(URS 4/26/01 Figure 2B)**

**PROJECT DESCRIPTION Figure 7  
Potrero Power Plant Unit 7 Project  
Elevation of the Proposed Unit 7  
(URS 5/18/01 Replacement Figure 2-3)**



**PROJECT DESCRIPTION Figure 8**  
**Potrero Power Plant Unit 7 Project**  
**Proposed Intake Structure and Discharge Pipelines**  
**(URS 4/30/01 Figure 2)**

**PROJECT DESCRIPTION Figure 9  
Potrero Power Plant Unit 7 Project  
Proposed Intake Structure Site Plan  
(URS 4/30/01 Figure 1)**

**PROJECT DESCRIPTION Figure 10  
Potrero Power Plant Unit 7 Project  
Cooling Water Intake Structure Design  
(URS 5/24/01 Figure 7-2)**

**PROJECT DESCRIPTION Figure 11  
Potrero Power Plant Unit 7 Project  
Structures Proposed for Demolition  
(URS 1/29/01 Figure 8-1)**

## REFERENCES

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- Harrer, Mark / Lee, Richard. 2002. Personal communications between Marc Pryor and Mirant's Project Director, West Region, and Richard Lee, CCSF Public Health.
- SECAL (Southern Energy California). 2000a. Application for Certification, Potrero Power Plant Unit 7 Project (00-AFC-4). Submitted to the California Energy Commission, May 31, 2000.
- SECAL (Southern Energy California). 2000b. Supplemental Information in Response to CEC Data Adequacy Request, Application for Certification, Potrero Power Plant Unit 7 Project (00-AFC-4). Submitted to the California Energy Commission, August 31, 2000.
- SECAL (Southern Energy California). 2001a. Amendment to the Application for Certification, Potrero Power Plant Unit 7 Project (00-AFC-4). Addresses the demolition of six existing structures. Submitted to the California Energy Commission, January 19, 2001.
- SECAL (Southern Energy California). 2001b. Amendment to the Application for Certification, Potrero Power Plant Unit 7 Project (00-AFC-4). Addresses data responses to staff's Data Requests 30 – 32 (Cultural Resources), revises AFC Section 8.3, Cultural Resources, and AFC Appendix R, Cultural Resources. Submitted to the California Energy Commission, January 31, 2001.
- MIRANT (Mirant Corp.). MIRANT2001d. Supplemental Information to the Application for Certification, Potrero Power Plant Unit 7 Project (00-AFC-4). Addresses 1) Intake and Discharge Structural Modifications; and 2) Figures I and II. Submitted to the California Energy Commission, May 2, 2001.
- MIRANT (Mirant Corp.). MIRANT2001f. Amendment to the Application for Certification, Potrero Power Plant Unit 7 Project (00-AFC-4). Addresses removal of the façade from the proposed project. Submitted to the California Energy Commission, April 20, 2001.

# RESPONSES TO PUBLIC AND AGENCY COMMENTS ON THE PRELIMINARY STAFF ASSESSMENT

## INTRODUCTION

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Staff has prepared responses to written comments made on the Preliminary Staff Assessment (PSA) that was issued on May 31, 2001. Following the issuance of the PSA, staff held four days of workshops at the Potrero Hill Neighborhood House that is in the vicinity of the proposed project site. Members of the public provided written comments at these workshops, and by mail and e-mail. Additional written comments were provided by the applicant, intervenors, other agencies and organizations that are considered members of the public. An example of the latter is the Golden Gate Audubon Society.

Following is a list of the comments that were submitted by members of the public and local, state and federal governmental agencies, and the City and County of San Francisco (CCSF)<sup>1</sup>, an intervenor. Brief descriptions of the comments are provided and in most cases the technical section, or sections, where responses are addressed. Responses appearing in technical sections appear under the heading "Responses to Public and Agency Comments on the PSA." Some comments are responded to directly after the brief descriptions.

For comments provided by the CCSF, a matrix that matches each comment number, brief description and the section (or sections) wherein responses will be found. The last part of this section contains photocopies of the enumerated comments that were provided by interested people and non-intervenor public agencies. This is where staff-assigned comment numbers (e.g., BCDC-1) originated. Copies of the actual comments provided by other parties, including the CCSF, have not been included because of the shear volume of comments received.

Where staff believes it is appropriate to respond to comments provided by the applicant and intervenors (other than CCSF), responses have been included in the text of the applicable technical sections. However, not all comments provided by the applicant and each non-CCSF intervenor have been addressed because they are parties to the proceedings and, as parties, they will have an opportunity to participate in the evidentiary hearings by presenting testimony, expert witnesses, and by cross-examining other party's witnesses.

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<sup>1</sup> Comments filed by CCSF included comments provided by the Potrero Task Force (PTF) and the Pier 70 Advisory Committee (P70).

## PUBLIC COMMENTS

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### FORM LETTERS / POSTCARDS

#### Letters Docketed June 12, 2001 (FL-1)

On May 30, 2001, Ms. Ellie Townsend-Smith passed 31 copies of a form letter written to the Energy Commission's Committee to Marc Pryor for docketing. There are a total of 41 signatures among the 31 copies.

The letter requests the Committee to "...reject Mirant Corporation's application for the Potrero Power Plant Unit 7" based on the following:

**FL-1A:** *"...southeast San Francisco already has two power plants, two freeways, city sewage plant, industrial pollution and large volume of truck traffic."* (Air Quality; Public Health; Land Use.)

**FL-1B:** *"The proposed expansion...would be too close to children and schools" and "...a dense residential area across the street from the plant."* (Air Quality; Public Health; Land Use.)

**FL-1C:** *"...Mirant's plans would release an additional 625 tons of air pollution each year for the life of the power plant, which is projected to be 40 years. Each year, 110 tons of soot and dust would be released from the plant."* (Air Quality; Public Health.)

#### Letters/Postcards Docketed July 17, 2001

On July 17, 2001, Ms. Ellie Townsend-Smith passed 97 copies of a form letter written to the Energy Commission's Chairman to Marc Pryor for docketing. In addition, by November 30, 2001, more than 200 postcards containing the same statements had been received.

The letters and postcards urge the Chairman to support: 1) the immediate shutdown of PG&E[s] Hunters Point power plant, 2) no expansion of Mirant's Potrero Power Plant and, 3) support clean, renewable energy and environmental justice.

**Response:** Because these requests were specifically directed to the Chairman urging his action, it is inappropriate for them to be addressed by staff.

#### MICHAEL ALEXANDER - RESIDENT AND MEMBER OF "SAN FRANCISCO BEAUTIFUL" (MA)

**MA-1:** *Bay Trail - Need to provide for Bayside Trail as an alternative to Illinois Street which is where truck traffic will conflict with trail users.* (Land Use.)

## **DEBORAH BARON - LANDOWNER AND RESIDENT (DB)**

**DB-1:** Particulate Matter - 1) *PM 2.5 must be examined and assessed with state of the art studies done by experts in the field.* 2) *110 tons of PM 10 is very high.* (Air Quality; Public Health.)

**DB-2:** *Alternatives - Analysis of known, planned and reasonably considered alternative sources of power that reduce or eliminate the need for the proposed expansion.* (Alternatives.)

**DB-3:** *Air Quality Mitigation - Staff's proposed diesel retrofitting mitigation will be of little use.* (Air Quality; Public Health.)

**DB-4:** *Air Quality Emissions Standards - Staff's statement that the plant's emissions would be 'within limits, whether plant is in SF or the desert' is faulty. The proposed location is a too densely populated and fast growing urban neighborhood.* (Air Quality; Public Health.)

## **MEDEA BENJAMIN - GLOBAL EXCHANGE (MB)**

**MB-1:** *Municipal Utility District - "We in SF will be voting in Nov. for a public power system + will have a totally new scenario that may well include the use of eminent domain to take over generation. Prudent to keep this all on hold until after Nov 6!"*

**Response:** The measures did not pass on November 6, 2001.

## **FRANCIS J. CLAUSS - LANDOWNER AND RESIDENT (FC)**

**FC-1:** *The area already experiences large amounts of fine dirt/ash from nearby industry.* (See Public Health.)

## **LEWIS C. EPSTEIN - RESIDENT (LE)**

**LE-1:** *How will the power get from the substations to the city? Overhead, underground, or a combination thereof. Concerned about the need for more electric distribution lines because the power plant will produce more electricity.* (Transmission System Engineering.)

## **ELLIOT GOLIGER - RESIDENT (EG)**

**EG-1:** *Air Pollution - Low emission gas microturbine generation should be required before any increased electricity generation is approved.* (See Alternatives.)

**EG-2:** *High Voltage Wires - Should be underground.* (Transmission Line Safety & Nuisance; Transmission System Engineering.)

## **GEORGE GUENTHER & BABETTE DREFKE - LANDOWNERS AND RESIDENTS (GG/BD)**

**GG/BD-1:** *PM10 and other emissions must be reduced by applying state-of-the-art pollution controls during construction and operation.* (Air Quality.)



**GG/BD-2:** *Approval must be conditional with the phase out of the Hunters Point Power Plant (HPPP).*

**Response:** The Energy Commission does not have the jurisdiction to require closure of the HPPP as a condition of the Potrero Unit 7 project.

**GG/BD-3:** *Emission reduction credits from outside impact area should not be allowed. (Air Quality.)*

**GG/BD-4:** *High Voltage Wires - All high tension wiring crossing residential areas must be underground.*

**Response:** The high-tension (voltage) transmission line from the project site to the Hunters Point Substation will be placed in the ground. They have nothing to do with the residential (distribution) lines.

**GG/BD-5:** *Hazardous Materials - Transportation of aqueous ammonia by barge, rather than by truck, should be studied. (Traffic & Transportation; Hazardous Materials Management.)*

#### **MATTIE KEMP - RESIDENT (MK)**

**MK-1:** *Why was this energy situation unforeseen? (General question, no response from staff.)*

#### **GAIL MALLIMSON - RESIDENT (GM)**

**GM-1:** *Global Warming - National Institute of Sciences report (week of June 5, 2001) stated that global warming will increase at an alarming rate if human pollution is not lessened. Pollution from this plant will contribute to human illness, rising water levels, and other problems, which will cost us much more than any (offsetting) economic benefits can provide. (Public Health.)*

**GM-2:** *Outdated Technology - Power plants that do not utilize state-of-the-art technology should not even be considered. (Public Health.)*

**GM-3:** *Medical Costs - Future medical costs to residents near the plant need to be considered. (Public Health.)*

#### **CARTER PAYNE - RESIDENT (CP)**

**CP-1:** *Alternative Energy - Encourage and subsidize cleaner sources of energy, such as solar. (See the text of Alternatives.)*

**CP-2:** *Conservation - Encourage and subsidize conservation. (See the text of Alternatives.)*

**CP-3:** *Health & Environmental Effects - These seem significant. (Public Health.)*

## **KAREN G. PIERCE - BAYVIEW-HUNTERS POINT COMMUNITY ADVOCATES (KP)**

**KP-1:** *Health Impacts - Public Health analysis is totally inadequate. The environmental impact analysis is incomplete. (Public Health.)*

**KP-2:** *Air Quality/Public Health - Citing and reliance upon standards does not address health concerns and possible health impacts of the project. (Public Health.)*

**KP-3:** *Air Quality offsets - Using emission reduction credits as offsets does not protect the residents of BVHP and Potrero Hill. (Air Quality; Public Health.)*

**KP-4:** *Air Quality mitigation - Staff's proposed mitigation regarding buses, etc. does not recognize and incorporate current initiatives to improve the air quality of southeast SF and an end to court ordered school busing. (Air Quality; Public Health.)*

## **KIM ROOKER - LANDOWNER AND RESIDENT (KR)**

**KR-1:** *Should emissions be vented so close to a hilltop community in-line with direct exposure? (Air Quality.)*

**KR-2:** *Power lines that run in front of homes effect wireless equipment and cause distortion in video equipment. (Public Health; Transmission Line Safety & Nuisance.)*

## **DIANA SCOTT (EMAIL VIA J. SCHECHTER) - RESIDENT (DS)**

**DS-1:** *Proposed PM10 mitigation and public health impacts of PM2.5. (Public Health.)*

## **NAOMI SHELAN - RESIDENT (NS)**

**NS-1:** *Air Quality - The air quality in the Potrero District is noticeably worse than that in the Haight District. Why not situate a power plant in the middle of nowhere where it can't hurt anyone. (Air Quality.)*

**NS-2:** *Situate the power plant in the middle of nowhere where it can't hurt anyone.*

**Response:** The Energy Commission is responsible for completing an independent evaluation of the power plant project (as proposed by the applicant) and for determining whether there are potential significant impacts and whether these impacts can be mitigated to less than significant levels. Public health effects, compatibility with nearby neighborhoods and schools, water quality, ground water contamination, and hazardous materials are just a few of the aspects and potential impacts that are closely reviewed by the Energy Commission. The Energy Commission has more than twenty-five years of experience in which about 90 power plant proposals have been analyzed. Regarding the location of the plant, the developer is responsible for selecting a site. Once the developer selects a site and files an Application for Certification with the Energy Commission, the Energy Commission staff will complete an independent assessment of the project and the site. The Energy Commission does not have the authority to require the developer to move the plant to another location.

## **ALLISON SHORE - LANDOWNER AND RESIDENT (AS)**

**AS-1:** *Alternatives - Need to consider future projected growth within 2 miles of the plant using a 40 year, longitudinal analysis, with planned growth. (Land Use.)*

**AS-2:** *Air Quality/EJ - Consider analysis of exposed populations as dust travels to unexposed populations in determinations of risk. See works of Andrew Szasz, Menser, and Laura Pulido. (Public Health.)*

## **MARK STOUT - RESIDENT AND MEMBER OF THE SAN FRANCISCO GREEN PARTY (MS)**

**MS-1:** *Socioeconomics/EJ – “The environmental justice implications...are huge, with 81% minority population within 2 mile radius of the plant, compared with a 48% Bay Area average...” (Public Health; Socioeconomics. Also see EJ discussions in: Executive Summary, Air Quality, Hazardous Materials Management, Waste Management, Soil & Water Resources, Visual Resources, Transmission Line Safety & Nuisance, and Traffic & Transportation.)*

**MS-2:** *Need for Expansion – The energy crisis has been “...manufactured by a deregulated oligopoly, aka the ‘confederate cartel’...” “The new SF-Brisbane MUD will likely seize any fossil plants and plan for their rapid closure once energy conservation and renewable energy solutions have been fully implemented.”*

**Response:** The MUD measures did not pass on November 6, 2001.)

## **MICHAEL STRAUZ & COMPANY - REAL ESTATE DEVELOPER (MSC)**

**MSC-1:** *Permitting the Potrero expansion would cause the loss of Central Waterfront housing potential. (Land Use.)*

**MSC-2:** *Expanding the power plant will blight the Central Waterfront and stifle or completely prevent housing development there. If approved, Mirant should pay San Francisco a land use mitigation fee of \$300 million per year. (Land Use.)*

**MSC-3:** *The zoning does not allow for a combined cycle plant. (Land Use.)*

**MSC-4:** *Power plant compatibility with the surrounding zoning. (Land Use.)*

**MSC-5:** *The Central Waterfront is undergoing a Better Neighborhoods planning process which calls for upgrading the neighborhood, and more residential units along the 3<sup>rd</sup> Street Corridor. (Land Use.)*

## **CHRIS WEEKS - PRECITA VALLEY NEIGHBORS AND NW BERNAL NEIGHBORHOOD (CW)**

**CW-1:** *Technology - Need to investigate cleaner technological alternatives, especially “Catylitica.” (Air Quality.)*

**CW-2:** *Air Quality Mitigation - Cement factory and retrofit CalTrain for electricity. (Air Quality.)*

**JACKIE WILLIAMS - LANDOWNER AND RESIDENT OF SOUTH SAN FRANCISCO (JW)**

**JW-1:** *PM 2.5 - SF Chronicle report, June 12, 2001, p. A7 regarding Boston Beth Israel Deacons Medical Center study on fine particulates. (Public Health.)*

**JW-2:** *Executive Order D-40-1 - Please read and evaluate.*

**Response:** Executive Order D-40-1, (signed June 11, 2001) under the State of Emergency proclaimed on January 17, 2001, was designed to alleviate the emergency by encouraging power generators to maximize generation capacity. Thus, air districts were directed to allow natural gas-fired power plants to operate in excess of their hourly, quarterly and/or annual emissions limitations. Executive Order D-40-1 expired on October 31, 2001.

**JW-3:** *Limit hours of operation of natural gas-fired power plants. (See text of Air Quality.)*

**JW-4:** *Please consider the possible impacts posed by alternatives at 1) SF Airport, 2) South SF sewage treatment plant, 3) near the South SF homeless shelter, and 4) at a Jamie Court site. Ms. Williams opposes any South SF/SF Airport area power plant. (See the text of Alternatives.)*

**JW-5:** *Aquatic Biology - How will food chain be affected? Is there a threshold, such as 5%, for the whole Bay? What will be the cumulative effects with other power plants and the proposed SF Airport runway expansion? (Aquatic Biological Resources.)*

**JW-6:** *Comments - Wants comments and responses in the FSA.*

**Response:** Comments and responses provided.

**GOLDEN GATE AUDUBON SOCIETY (AUD)**

**AUD-1:** *Mitigation - The Society opposes the project because it has potentially devastating impacts on aquatic resources and to the human community. Mitigation through habitat restoration will not sufficiently mitigate the project's impacts. (Aquatic Biological Resources.)*

**AUD-2:** *Food Chain - The pumping and heating of 500,00 acre-feet of Bay waters will impact the food chain, Dungeness crab, fish, etc. (Aquatic Biological Resources.)*

**AUD-3:** *Use of ocean [bay] water may impact the base of the food chain. (Aquatic Biological Resources.)*

**AUD-4:** *Impacts of warming such a large amount of water on Dungeness crab, other crabs, habitat, mitigation, and economic impacts. (Aquatic Biological Resources.)*

**AUD-5:** *Impingement - What will be the impacts of impingement?* (Aquatic Biological Resources.)

**AUD-6:** *Hydrologic Impacts - What will be the hydrologic impacts of once-through cooling?* (Aquatic Biological Resources; Soil & Water Resources.)

**AUD-7:** *Impacts of the disturbed contaminants outside the silt curtain, curtain effectiveness, and contaminants from work done outside the silt curtain for the cooling system intake and discharge systems.* (Aquatic Biological Resources.)

**AUD-8:** *Cumulative Impacts - Cumulative impacts that will result from other projects, such as the dredging at the Port of Oakland and the San Francisco Airport expansion must be analyzed.* (Aquatic Biological Resources; Soil & Water Resources.)

**AUD-9:** *Mitigation – In-kind mitigation for this project, and potential for mitigation.* (Aquatic Biological Resources; Soil & Water Resources.)

**AUD-10:** *Mitigation – Pier removal and tidal wetlands creation as mitigation. Also, mitigation for any impacts on planktonic populations, if impacts exist.* (See the text of Aquatic Biological Resources.)

**AUD-11:** *Environmental Justice and Subsistence Fishing - Power plant emissions will enter the food chain. This will impact the health of those who depend on near shore fisheries for subsistence living.* (Public Health.)

## **SAN FRANCISCO BAYKEEPER (SFBK)**

**SFBK-1:** *CEQA requirements for consideration by the public of all project impacts and alternatives prior to approval.* (See the discussion of the Energy Commission's power plant licensing process in the Executive Summary.)

**SFBK-1A:** *Discharge of Cooling Water - Impacts due to doubling the volume of cooling waters discharged.* (Soil & Water Resources.)

**SFBK-1B:** *Contaminated Sediments - Impacts due to dredging of contaminated sediments during the construction of the of once through cooling system.* (Soil & Water Resources; Waste Management; Public Health.)

**SFBK-1C:** *Impacts on Aquatic Species - Data provided by the applicant is old. Staff's proposal that critical information be collected after the facility begins operation denies the public, agencies and the decision-makers of essential information.* (Aquatic Biological Resources; Waste Management; Public Health.)

**SFBK-1D:** *Cumulative Impacts - Completion of a meaningful evaluation of cumulative project impacts should be done and provided to the public and decision-makers prior to the FSA.* (Most sections of the FSA contain discussions of cumulative impacts.)

**SFBK-2A:** *Cooling Alternatives - A full analysis of the feasibility of dry-cooling technologies should be done.* (Aquatic Biological Resources, Appendix.)

**SFBK-2B:** *Aquatic Biological Resources Mitigation - The PSA suggests unspecified sums of money for unspecified mitigation projects.* (Aquatic Biological Resources.)

**SFBK-3:** *Completion of Studies to Satisfy CEQA - CEQA requires that the previously mentioned studies be completed and circulated in the final project assessment for public review and comment.* (See the response to **SFBK-1** above.)

**SFBK-4A:** *Proposed USEPA Rules regarding Cooling - Rules proposed by USEPA would prohibit certifying a once-through cooled power plant discharging to an estuary.* (Soil & Water Resources.)

**SFBK-4B:** *Once-Through Cooling is not BTA - “Because it is the most destructive, least protective, antiquated technology, once-through cooling cannot be considered Best Technology Available (BTA).” The proposal does not comply with Section 316(b) of the [federal] Clean Water Act.* (Soil & Water Resources.)

**SFBK-4C:** *Dry Cooling Required - “Dry cooling must be required because it is an available, effective, affordable technology, which minimizes adverse impacts.”* (Aquatic Biological Resources, Appendix; Soil & Water Resources)

**SFBK-4D:** *Screen and Booms - “Fish protection technologies proposed by the applicant ... do not comply with the [federal] Clean Water Act’s mandate to minimize adverse environmental impacts.”* (Soil & Water Resources.)

**SFBK-4E:** *Dry Cooling is Viable - “... we note that dry cooling is economically viable.”* (Aquatic Biological Resources, Appendix; Soil & Water Resources.)

## **AGENCY COMMENTS**

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### **NATIONAL MARINE FISHERIES SERVICE (NMFS)**

**NMFS-1:** *Aquatic Biological Resources: regarding the construction of the cooling water system intake.* (Aquatic Biological Resources.)

**NMFS-2:** *Aquatic Biological Resources: regarding turbidity caused by construction.* (Aquatic Biological Resources.)

**NMFS-3:** *Aquatic Biological Resources: regarding noise and vibrations created during pile driving and its effects on fishes.* (Aquatic Biological Resources.)

**NMFS-4:** *Aquatic Biological Resources: regarding the potential for contaminants to spread beyond the silt curtain.* (Aquatic Biological Resources.)

**NMFS-5:** *Aquatic Biological Resources: regarding concentrations of copper and nickel in discharge water.* (Aquatic Biological Resources; Soil & Water Resources.)

**NMFS-6:** *Aquatic Biological Resources: regarding cumulative impacts associated with the simultaneous operations of the Potrero and Hunters Point power plants.* (Aquatic Biological Resources.)

**NMFS-7:** *Aquatic Biological Resources: regarding mitigation for the loss of habitat.* (Aquatic Biological Resources.)

**NMFS-8:** *Aquatic Biological Resources: regarding mitigation for entrainment and impingement effects.* (Aquatic Biological Resources.)

**NMFS-9:** *Aquatic Biological Resources: regarding alternative cooling technologies.* (Aquatic Biological Resources; Alternatives.)

**NMFS-10:** *Aquatic Biological Resources: regarding the clarification of significant adverse impacts.* (Aquatic Biological Resources.)

**NMFS-11:** *Soil and Water Resources: regarding closed-cycle cooling water systems and alternative cooling systems.* (Aquatic Biological Resources, Appendix.)

**NMFS-12:** *Soil and Water Resources: a complete cost-benefit analysis should be provided for the various cooling alternatives.* (See Aquatic Biological Resources, Appendix.)

## **SF BAY CONSERVATION AND DEVELOPMENT COMMISSION (BCDC)**

**BCDC-1:** *1982 Non-Siting Study, Public Resources Code Sections 25525 and 66645 [McAteer-Petris Act].* (Alternatives.)

**BCDC-2:** *Soil and Water Resources, Aquatic Biological Resources, and Alternatives, Public Resources Code Section 66605 [McAteer-Petris Act] regarding Bay fill.* (Soil & Water Resources.)

**BCDC-3:** *Soil and Water Resources, Aquatic Biological Resources, and Alternatives, Public Resources Code Section 66605 [McAteer-Petris Act] regarding water quality.* (Aquatic Biological Resources; Soil & Water Resources.)

**BCDC-4:** *Soil and Water Resources, Aquatic Biological Resources, and Alternatives, Public Resources Code Section 66605 [McAteer-Petris Act] regarding dredging.* (Soil & Water Resources.)

**BCDC-5:** *Soil and Water Resources, regarding nonapplicability of the Coastal Act.* (Soil & Water Resources.)

**BCDC-6:** *Soil and Water Resources, regarding consultation with the San Francisco Bay Regional Water Quality Control Board (SFRWQCB) and the State Water Resources Board for projects involving Bay fill. (Soil & Water Resources.)*

**BCDC-7:** *Soil and Water Resources, regarding nonapplicability of the San Francisco Bay Plan's Dredging Policies 1 and 2. (Soil & Water Resources; Waste Management.)*

**BCDC-8:** *Soil and Water Resources, regarding dredging permitting agencies. (Soil & Water Resources.)*

**BCDC-9:** *Aquatic Biological Resources, regarding PRC Section 66605(d) [McAteer-Petris]. (Aquatic Biological Resources.)*

**BCDC-10:** *Alternatives, regarding PRC Sections 66605(b) and (c) [McAteer-Petris] pertaining to upland alternatives. (See text of the Aquatic Biological Resources Appendix.)*

**BCDC-11:** *Alternatives, requesting the Energy Commission staff perform its own cooling alternatives analysis. (See text of the Aquatic Biological Resources Appendix.)*

**BCDC-12:** *Alternatives, noting that the PSA's alternative sites A through E are within BCDC's jurisdiction and would require a finding that no upland alternatives exist for each. (See **BCDC-1.**)*

**BCDC-13:** *Land Use/Public Access, regarding both the San Francisco Bay Plan and BCDC's jurisdiction. (Land Use.)*

**BCDC-14:** *Land Use/Public Access, regarding Bay fill mitigation. (Land Use.)*

**BCDC-15:** *Visual Resources/Appearance, Design, and Scenic Views, regarding cumulative impacts on views from the Bay Trail alignment on Illinois Street. (Visual Resources.)*

## **CALIFORNIA DEPARTMENT OF FISH AND GAME (CDFG)**

**CDFG-1:** *Thermal Impacts: direct and indirect impacts on fish and invertebrates. (Aquatic Biological Resources; Soil & Water Resources.)*

**CDFG-2:** *Contaminated Sediments: regarding polynuclear aromatic hydrocarbons (PAHs) found in the location of the proposed intake structure. (Aquatic Biological Resources; Waste Management.)*

**CDFG-3:** *Contaminated Sediments: regarding the need for maintenance dredging. (Aquatic Biological Resources; Waste Management.)*

**CDFG-4:** *Bay Fill: regarding the need to determine the amount of fill so that adequate mitigation can be determined by the resource agencies. (Aquatic Biological Resources; Soil & Water Resources.)*



**CDFG-5:** *Impingement and Entrainment: regarding potential increases in the impacts to marine resources due to impingement and entrainment. (Aquatic Biological Resources.)*

**CDFG-6:** *Impingement and Entrainment: regarding the need to estimate before (i.e., baseline) and after (i.e., monitoring) construction of the new intake system to more accurately measure adverse impacts. (Aquatic Biological Resources.)*

**CDFG-7:** *Impingement and Entrainment: regarding the form of mitigation. (Aquatic Biological Resources.)*

**CDFG-8:** *Impingement and Entrainment: regarding possible mitigation options for other project related impacts such as Bay fill and the effects of the thermal plume. (Aquatic Biological Resources.)*

**CDFG-9:** *Impingement and Entrainment: recommends that the Energy Commission consider alternatives to the proposed cooling system. (Aquatic Biological Resources.)*

**CDFG-10:** *Cumulative Impacts: regarding the potential cumulative impingement, entrainment and thermal impacts from the simultaneous operation of both the Potrero Power Plant and the Hunters Point Power Plant. (Aquatic Biological Resources.)*

**CDFG-11:** *Construction: regarding the need to maintain silt curtains to ensure their effectiveness in protecting marine resources, and the designated and training of a biologist. (Aquatic Biological Resources; Soil and Water Resources.)*

**CDFG-12:** *Cooling Water Intake System: regarding biological diversity of, and disturbance to, benthic organisms. (Aquatic Biological Resources.)*

**CDFG-13:** *Cooling Water Intake System: the FSA should ensure and outline proper maintenance of the silt curtains. (Aquatic Biological Resources; Soil and Water Resources.)*

**CDFG-14:** *Containment and clean-up plan in the event of a frac-out during the installation of cables under Islais Creek. (Aquatic Biological Resources.)*

**CDFG-15:** *Marine Habitats: regarding elasmobranchs. (Aquatic Biological Resources.)*

**CDFG-16:** *Marine Habitats: recommends that additional field surveys designed to evaluate the use of the project site by elasmobranchs be conducted. (Aquatic Biological Resources.)*

**CDFG-17:** *Marine Habitats: the applicant misstates that dungeness crab are recruited into the sport fishery when in the 37 to 160 millimeter (mm) range. Actually, they are not recruited to the sport fishery until they range from 146 to 152 mm in size. (Aquatic Biological Resources.)*

**CDFG-18:** *Marine Habitats: herring are both an important commercial species and a very important forage fish. (Aquatic Biological Resources.)*

**CDFG-19:** *Marine Habitats: herring eggs are adhesive, not free-floating.* (Aquatic Biological Resources.)

**CDFG-20:** *Marine Habitats: regarding herring spawning events in recent years that have consistently occurred in the vicinity of the Potrero Power Plant.* (Aquatic Biological Resources.)

## **CALIFORNIA DEPARTMENT OF TOXIC SUBSTANCES CONTROL (DTSC)**

**DTSC-1:** *Sediments: Regarding the potential for dredging to expose.* (Public Health; Waste Management.)

**DTSC-2:** *Groundwater: Because groundwater contamination has been identified underlying the project site, it is important to evaluate the impacts of dewatering activities. Also, a qualified professional should evaluate the potential worker health and safety issues.* (Soil & Water Resources; Worker Safety & Fire Protection.)

**DTSC-3:** *Soils: Regarding the need to revise the Site Mitigation and Implementation Plan.* (Soil & Water Resources; Waste Management.)

**DTSC-4:** *Soil Contamination: Regarding a containment mitigation plan that addresses hazardous substances which must be abated in the buildings that are proposed for demolition.* (Waste Management.)

**DTSC-5:** *Hazardous Waste Storage Area: Construction drawings, when completed, should indicate the location of the construction contractor's hazardous waste storage area. Also, if the soil meets the definition of a hazardous waste and the storage area is not on site, requirements for transportation must be complied with or a variance obtained prior to implementation.* (Waste Management; Traffic & Transportation.)

**DTSC-6:** *PG&E Bankruptcy and Clean Up Responsibilities: regarding the need to require that, due to PG&E's bankruptcy, Mirant be fulfills the responsibilities outlined in the PSA.* (Public Health; Waste Management.)

**DTSC-7:** *Public Health, Construction Phase Impacts: the analysis should be revised to be consistent with the Site Mitigation and Implementation Plan.* (Public Health.)

**DTSC-8:** *Waste Management, Project Specific Impacts, On-Shore Soil Contamination: regarding additional criterion for disposal of excess soil, and segregation of soils that contain different chemicals.* (Waste Management.)

**DTSC-9:** *Waste Management, Project Specific Impacts, Construction: regarding the entity responsible for classification and determination of the appropriate disposal location for wastes. Also, if bentonite slurry is used during the boring under Islais Creek, that the slurry should not be reused unless data is available that demonstrates that the material coming into contact with the bentonite would be "clean."* (Soil & Water Resources; Waste Management.)

**DTSC-10:** *Waste Management, Facility Closure: regarding financial assurance for closure. (Waste Management.)*

**DTSC-11:** *Waste Management, Conclusions: recommends that the construction footprint be adequately characterized to minimize the potential for unknown contamination being uncovered during construction. (Waste Management; Soil & Water Resources.)*

**DTSC-12:** *Soil and Water Resources, Condition of Certification 5: the Health and Safety Plan should address the potential for workers to come into contact with contaminated groundwater, and if so, evaluate potential worker health and safety issues. (Soil & Water Resources; Worker Safety & Fire Protection.)*

**DTSC-13:** *Soil and Water Resources, Condition of Certification 6: this should be amended to require SFRWQCB approval of the Ecological Risk Evaluation and remedy selection document prior to site mobilization. Also, the 60 day timeframe may be insufficient. (Soil & Water Resources.)*

**DTSC-14:** *Waste Management, Condition of Certification 5: this should be revised to require that the SFRWQCB, as the lead environmental agency, be contacted in the event that currently unknown contamination is identified to be consistent with the recommendation on PSA page 4.14-35, Soil and Water Condition of Certification 8. (Waste Management.)*

## **SAN FRANCISCO REGIONAL WATER QUALITY CONTROL BOARD (RWQCB)**

**RWQCB-1:** *Thermal Impacts and Best Available Technology (BAT): due to the absence of real time monitoring data, the environmental impacts of the new cooling water discharges cannot be fully characterized. The Board's draft National Pollution Discharge Elimination System (NPDES) permit's exceptions to the thermal plan and its conditional finding that the proposed intake structure is BAT may be revised or revoked based on the results of studies. (Aquatic Biological Resources; Soil & Water Resources.)*

**RWQCB-2:** *Water Quality During Intake Structure Construction: regarding concern about possible water quality impacts due to turbidity and mobilization of contaminants during dredging and capping activities. (Soil & Water Resources.)*

**RWQCB-3:** *Post-Construction Water Quality Impacts: regarding whether the increased intake and discharge of cooling water will affect circulation in the Bay locally, leading to remobilization of contaminants. (Soil & Water Resources.)*

**RWQCB-4:** *Groundwater Contamination: regarding the need for Mirant to develop a Construction Best Management Plan (BMP). (Soil & Water Resources.)*

**Matrix for Responses to the City and County of San Francisco's Comments on the PSA  
(Includes the Potrero Task Force and Pier 70 Citizen's Advisory Task Force Comments)**

<b>CITY AND COUNTY OF SAN FRANCISCO (CCSF) W/ POTRERO CITIZEN ADVISORY TASK FORCE (PTF) AND PIER 70 CITIZENS ADVISORY GROUP (P70)</b>		
<b>Comment #</b>	<b>Subject</b>	<b>Addressed in FSA Section(s):</b>
	<b>INTRODUCTION</b>	
CCSF-1A	The PSA is incomplete.	See the discussion of the CEC licensing process in the Executive Summary.
CCSF-1A	A revised PSA should be issued.	The Committee ruled against this request.
	<b>MAXWELL ORDINANCE</b>	
CCSF-2A	Requirements of the Maxwell Ordinance.	Executive Summary.
CCSF-2B	Compliance with the Maxwell Ordinance.	Executive Summary; Air Quality.
CCSF-2C	Maxwell Ordinance and shut down of the Hunters Point Power Plant HPPP.	Executive Summary. The Energy Commission does not have the jurisdiction to require closure of the HPPP.
	<b>AIR QUALITY</b>	
CCSF-3A	Assessment of current local air pollution impacts.	Air Quality.
CCSF-3B	Assesment of public health impacts of PM2.5	Air Quality; Public Health.
CCSF-3C	SO2 construction impacts.	Air Quality; Public Health.
CCSF-3D	Toxic health effects of diesel emissions from construction activities.	Public Health.
CCSF-3E	Construction impacts should be mitigated.	Air Quality; Public Health.
CCSF-3F	Effects of methane and CO2.	Air Quality; Public Health.
CCSF-3G	Cumulative impacts discussion in air quality.	Air Quality; Public Health.

**Matrix for Responses to the City and County of San Francisco's Comments on the PSA  
(Includes the Potrero Task Force and Pier 70 Citizen's Advisory Task Force Comments)**

CCSF-3H	SO2 credits used as mitigation for localized PM10 impacts.	Air Quality.
CCSF-3I	Proposed emission reduction credits (ERCs).	Air Quality.
CCSF-3J	Analysis of emissions from construction of the transmission line to the Hunters Point Substation.	Air Quality; Public Health.
CCSF-3K	NOx mitigation and the Otay Mesa Power Project.	Air Quality.
CCSF-3L	Proposed PM10 mitigation.	Air Quality; Public Health.
CCSF-3M	Mitigation and compliance with LORS.	Air Quality.
CCSF-3N	Request for an air monitoring station.	Air Quality; Public Health.
	<b>AQUATIC BIOLOGY</b>	
CCSF-4A	Intake withdrawal and thermal discharge of Bay water.	Aquatic Biological Resources; Soil & Water Resources.
CCSF-4B	Entrainment and impingement effects upon South Bay aquatic species populations.	Aquatic Biological Resources.
CCSF-4C	Entrainment and impingement mortality estimates.	Aquatic Biological Resources.
CCSF-4D	Thermal effects of once-through cooling.	Aquatic Biological Resources; Soil & Water Resources.
CCSF-4E	Sediment boundary layer processes.	Aquatic Biological Resources; Soil & Water Resources.
CCSF-4F	Condition of sediments.	Aquatic Biological Resources; Waste Management.
CCSF-4G	Altered trophodynamics.	Aquatic Biological Resources; Soil & Water Resources.
CCSF-4H	Cumulative impacts on aquatic biology.	Aquatic Biological Resources; Soil & Water Resources.
CCSF-4I	Marine monitoring.	Aquatic Biological Resources.
	<b>CULTURAL RESOURCES</b>	
CCSF-5A	Qualified Technology Consultant.	Cultural Resources.
CCSF-5B	Proposed mitigation.	Cultural Resources.
CCSF-5C	Demolition of the meter and compressor houses.	Cultural Resources.
	<b>HAZARDOUS MATERIALS MANAGEMENT</b>	

**Matrix for Responses to the City and County of San Francisco's Comments on the PSA  
(Includes the Potrero Task Force and Pier 70 Citizen's Advisory Task Force Comments)**

CCSF-6A	Proposed project will be the largest hazardous materials storage site in San Francisco.	Hazardous Materials Handling.
CCSF-6B	New processes and technologies may eliminate the need to transport and store aqueous ammonia.	Hazardous Materials Handling.
CCSF-6C	Preparation of a Risk Management Program (RMP).	Hazardous Materials Handling.
	<b>LAND USE</b>	
CCSF-7A	Land use changes are not adequately addressed in the PSA.	Land Use.
CCSF-7B	Construction coordination should be required.	Land Use; Noise; Traffic & Transportation.
CCSF-7C	Public access to the shoreline.	Land Use.
CCSF-7D	Agreements with San Francisco Port.	Land Use.
	<b>NOISE</b>	
CCSF-8	Noise control plan.	Noise.
	<b>PUBLIC HEALTH</b>	
CCSF-9A	Non-cancer impacts.	Public Health.
CCSF-9B	Public health impacts of PM2.5.	Public Health.
	<b>SOCIOECONOMICS</b>	
CCSF-10	Environmental Justice.	Land Use, Socioeconomics, Traffic & Transportation. (See also: Executive Summary, Air Quality, Public Health, Hazardous Materials Handling, Noise, Waste Management, Soil & Water Resources, Visual Resources, Transmission Line Safety & Nuisance.)
	<b>TRAFFIC AND TRANSPORTATION</b>	

**Matrix for Responses to the City and County of San Francisco's Comments on the PSA  
(Includes the Potrero Task Force and Pier 70 Citizen's Advisory Task Force Comments)**

CCSF-11A	Construction impacts on traffic.	Traffic & Transportation.
CCSF-11B	Plant operations impacts on traffic.	Traffic & Transportation.
CCSF-11C	Coordination with City projects.	Land Use; Traffic & Transportation.
	<b>TRANSMISSION LINE SAFETY AND NUISANCE</b>	
CCSF-12	Validation measurements for underground transmission lines.	Transmission Line Safety & Nuisance.
	<b>VISUAL RESOURCES</b>	
CCSF-13A	Impacts on Bay views.	Visual Resources.
CCSF-13B	Streetscape improvements.	Visual Resources.
	<b>WASTE MANAGEMENT</b>	
CCSF-14	Ongoing remediation at the Potrero Power Plant site.	Waste Management.
	<b>WATER AND SOILS</b>	
CCSF-14A	Sufficiency of data or analyses to determine water quality impacts.	Aquatic Biological Resources.
CCSF-14B	Overall summary.	Aquatic Biological Resources; Soil & Water Resources.
CCSF-14C(i)	Cooling water discharge; ongoing thermal effects.	Aquatic Biological Resources; Soil & Water Resources.
CCSF-14C(ii)	Impacts due to entrainment or impingement of biota.	Aquatic Biological Resources.
CCSF-14C(iii)	Issues related to certain regulatory constraints.	Soil & Water Resources.
CCSF-14C(iv)	Cross media issues.	Aquatic Biological Resources; Soil & Water Resources; Public Health.
CCSF-14C(v)	Circulation patterns.	Soil & Water Resources.
CCSF-14D(i)	Section coordination between Aquatic Biology and Soil and Water Resources.	Aquatic Biological Resources.
CCSF-14D(ii)	Ongoing thermal impacts.	Aquatic Biological Resources; Soil & Water Resources.
CCSF-14D(iii)	Impingement.	Aquatic Biological Resources.
CCSF-14D(iv)	Entrainment.	Aquatic Biological Resources.
CCSF-14D(v)	Species identification.	Aquatic Biological Resources.

**Matrix for Responses to the City and County of San Francisco's Comments on the PSA  
(Includes the Potrero Task Force and Pier 70 Citizen's Advisory Task Force Comments)**

CCSF-14D(vi)	Intermittant heat treatment.	Soil & Water Resources.
CCSF-14D(vii)	Post-construction studies of entrainment impacts.	Aquatic Biological Resources.
CCSF-14D(viii)	Post-construction studies of impingement impacts.	Aquatic Biological Resources.
CCSF-14D(ix)	Chemical impacts.	Aquatic Biological Resources; Soil & Water Resources.
CCSF-14D(x)	Stormwater flows.	Soil & Water Resources.
CCSF-14D(xi)	Clean Water Act description.	Soil & Water Resources.
CCSF-14D(xii)	California Water Code.	Soil & Water Resources.
CCSF-14D(xiii)	San Francisco's pollution prevention program.	Soil & Water Resources.
CCSF-14D(xiv)	Cooling water discharge.	Soil & Water Resources.
CCSF-14D(xv)	Compliance with laws.	Soil & Water Resources.
CCSF-14D(xvi)	Technical or interpretation errors.	Aquatic Biological Resources.
CCSF-14E(i)	Construction impacts on fisheries.	Aquatic Biological Resources.
CCSF-14E(ii)	Loss of Bay habitat.	Aquatic Biological Resources.
CCSF-14E(iii)	Impingement mitigation (maintenance and net replacement).	Aquatic Biological Resources.
CCSF-14E(iv)	Heat treatment.	Aquatic Biological Resources.
CCSF-14E(v)	Erosion control.	Soil & Water Resources.
CCSF-14E(vi)	Other mitigation.	Soil & Water Resources.
CCSF-14F(i)	Stormwater runoff.	Soil & Water Resources.
CCSF-14F(ii)	Coordination with CSO Control Program or Stormwater Program.	Soil & Water Resources.
CCSF-14F(iii)	Potential use of water outfall as a heating source.	Comment noted.
CCSF-14G(i)	Dredging of contaminated soils.	Soil & Water Resources.
CCSF-14G(ii)	High concentrations of Polyaromatic Hydrocarbons (PAHs) in site soil.	Soil & Water Resources; and Public Health.
	<b>WORKER SAFETY AND FIRE PROTECTION</b>	
CCSF-15	Agreement with discussion and conditions.	Comment noted.
	<b>POWER PLANT RELIABILITY</b>	
CCSF-16A	Equipment availability.	Power Plant Reliability.
CCSF-16B	Fuel and water availability.	Power Plant Reliability.



**Matrix for Responses to the City and County of San Francisco's Comments on the PSA  
(Includes the Potrero Task Force and Pier 70 Citizen's Advisory Task Force Comments)**

	<b>TRANSMISSION SYSTEM ENGINEERING</b>	
CCSF-17A	Detailed Facilities Study and California Independent System Operator analysis.	
CCSF-17B	Transmission adequacy without the Hunters Point Power Plant.	
CCSF-17C	San Francisco planning criteria.	
CCSF-17D	Need for market power mitigation.	
CCSF-17E	Accuracy.	
	<b>ALTERNATIVES</b>	
CCSF-18A	Evaluation of alternative sites.	Alternatives.
CCSF-18B	Evaluation of transmission alternatives.	Alternatives.
CCSF-18C(i)	Demand side management.	Alternatives.
CCSF-18C(ii)	Distributed generation.	Alternatives.
CCSF-18C(iii)	Renewable resources.	Alternatives.
CCSF-18C(iv)	Alternative generation capacities.	Alternatives.
<b>CITY AND COUNTY OF SAN FRANCISCO – POTRERO CITIZEN ADVISORY TASK FORCE (PTF)</b>		
<b>Comment #</b>	<b>Subject</b>	<b>Addressed in FSA Section(s):</b>
PTF-1	Air quality impacts.	Public Health.
PTF-2	Loss of Bay habitat.	Addressed in the <u>text</u> of Aquatic Biological Resources.
PTF-3	Hazardous materials transportation and storage.	Hazardous Materials Handling, Traffic & Transportation.
PTF-4	Environmental Justice.	Executive Summary, Socioeconomics, Air Quality, Public Health, Hazardous Materials Handling, Noise, Waste Management, Water Resources, Visual

**Matrix for Responses to the City and County of San Francisco's Comments on the PSA  
(Includes the Potrero Task Force and Pier 70 Citizen's Advisory Task Force Comments)**

		Resources, Transmission Line Safety & Nuisance, Traffic & Transportation and Land Use.
PTF-5	Land use developments.	Land Use.
PTF-6	Water supply shortages.	Soil & Water Resources.
PTF-7	Water quality.	Soil & Water Resources.
PTF-8	Plant alternatives.	Aquatic Biological Resources, Appendix; Alternatives
PTF-9	Evaluation of plant operations.	Comment noted.
PTF-10	Few community benefits.	Socioeconomics.

**CITY AND COUNTY OF SAN FRANCISCO – PIER 70 CITIZENS ADVISORY GROUP (P70)**

<b>Comment #</b>	<b>Subject</b>	<b>Addressed in FSA Section(s):</b>
P70-1	Environmental Justice.	Socioeconomics. (See also: Executive Summary, , Air Quality, Public Health, Hazardous Materials Handling, Noise, Waste Management, Water Resources, Visual Resources, Transmission Line Safety & Nuisance, Traffic & Transportation and Land Use.)
P70-2A	Water quality/biology.	Addressed in the <u>text</u> of Aquatic Biological Resources, and in response to comment portion of Soil & Water Resources
P70-2B	Project construction dredging impacts.	Soil & Water Resources, Public Health.
P70-3	Air quality/emissions.	Public Health.
P70-4	Public access/open space.	Land Use.
P70-5A	Recordation of Power Plant site as last resort to adaptive use.	Cultural Resources.

**Matrix for Responses to the City and County of San Francisco's Comments on the PSA  
(Includes the Potrero Task Force and Pier 70 Citizen's Advisory Task Force Comments)**

P70-5B	Transfer of seismic mitigation costs to Pier 70 historic resources.	Cultural Resources.
P70-5C	Educational exhibit of Central Waterfront development.	Cultural Resources.
P70-6	Ethnic, historic and prehistoric material encounters during on- and off-site excavations.	Cultural Resources.
P70-7A	Funding of preservation activities at Pier 70 and in the Dogpatch neighborhood.	Land Use; Cultural Resources.
P70-7B	Impacts on non-industrial uses. Undergrounding of existing utility lines in the Potrero Hill, Dogpatch and Bayview Hunters Point areas.	Land Use.
P70-7C	Power plant expansion's impacts on housing.	Land Use.
P70-7D	Visibility of power plant from viewing areas such as Warm Water Cove and Aqua Vista Parks.	Visual Resources.
P70-7E	Screening of PG&E's Potrero Substation.	Visual Resources.
P70-7F	Urban forestry.	Visual Resources.
P70-7G	Power plant illumination.	Visual Resources.
P70-8	Transportation including traffic congestion.	Traffic & Transportation.
P70-9	Construction noise impacts.	Noise.

# **AIR QUALITY**

Testimony of Tuan Ngo, P.E.

## **INTRODUCTION**

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This analysis addresses the potential air quality impacts resulting from criteria air pollutant emissions created by the construction and operation of the Potrero Power Plant Unit 7 Project (Unit 7). Criteria air pollutants are those for which a state or federal standard has been established. They include nitrogen dioxide (NO<sub>2</sub>), sulfur dioxide (SO<sub>2</sub>), carbon monoxide (CO), ozone (O<sub>3</sub>) and its precursors: nitrogen oxide (NO<sub>x</sub>), volatile organic compounds (VOC), particulate matter less than 10 microns in diameter (PM<sub>10</sub>) and its precursors (NO<sub>x</sub>, VOC, SO<sub>x</sub>), and lead (Pb).

In completing this analysis, the Energy Commission staff evaluated the following major points:

- Whether the project is likely to conform with applicable Federal, State and the Bay Area Air Quality Management District (District) air quality laws, ordinances, regulations and standards, as required by Title 20, California Code of Regulations, section 1742.5 (b);
- Whether the project is likely to cause significant air quality impacts, including new violations of ambient air quality standards or contributions to existing violations of those standards, as required by Title 20, California Code of Regulations, section 1742 (b); and
- Whether the mitigation proposed for the project is adequate to lessen the potential impacts to a level of less than significant, as required by Title 20, California Code of Regulations, section 1744 (b).

## **LAWS, ORDINANCES, REGULATIONS AND STANDARDS (LORS)**

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### **FEDERAL**

The federal Clean Air Act requires any new major stationary sources of air pollution and any major modifications to major stationary sources to obtain a construction permit before commencing construction. This process is known as New Source Review (NSR). Its requirements differ depending on the attainment status of the area where the major facility is to be located. Prevention of Significant Deterioration (PSD) requirements apply in areas that are in attainment of the national ambient air quality standards. The non-attainment area NSR requirements apply to areas that have not been able to demonstrate compliance with national ambient air quality standards. The entire program, including both PSD and non-attainment NSR permit reviews, is referred to as the federal NSR program.

Title V of the federal Clean Air Act requires states to implement and administer an operating permit program to ensure that large sources operate in compliance with the requirements included in Title 40, Code of Federal Regulations, section 70. A Title V

permit contains all of the requirements specified in different air quality regulations which affect an individual project.

The U.S. Environmental Protection Agency (EPA) has reviewed and approved the Bay Area Air Quality Management District's regulations and has delegated to the District the implementation of the federal PSD, Non-attainment NSR, and Title V programs. The District implements these programs through its own rules and regulations, which are, at a minimum, as stringent as the federal regulations.

The Unit 7's gas turbines are also subject to the federal New Source Performance Standards (NSPS). These standards include a NO<sub>x</sub> emissions concentration of no more than 75 parts per million (ppm) at 15 percent excess oxygen (ppm@15%O<sub>2</sub>), and a SO<sub>x</sub> emissions concentration of no more than 150 ppm@15%O<sub>2</sub>.

## **STATE**

California State Health and Safety Code, section 41700, requires that: "no person shall discharge from any source whatsoever such quantities of air contaminants or other material which cause injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public, or which endanger the comfort, repose, health, or safety of any such persons or the public, or which cause, or have a natural tendency to cause, injury or damage to business or property."

## **LOCAL**

### **Bay Area Air Quality Management District**

As part of the licensing process, in lieu of issuing a construction permit to the applicant for the Unit 7, the District prepared a Determination of Compliance (DOC), which evaluates whether and under what conditions the proposed project will comply with the District's applicable rules and regulations. The Energy Commission staff coordinated its air quality analysis with the District staff as they prepare the DOC, and has incorporated the Final DOC recommended conditions of certification in this Final Staff Assessment (FSA).

The project is subject to the specific District rules and regulations that are briefly described below:

### **Regulation 2**

Rule 1 - General Requirements. This rule contains general requirements, definitions, and a requirement that an applicant submit an application for an authority to construct and permit to operate.

Rule 2 - New Source Review. This rule applies to all new and modified sources. The following sections of Rule 2 are the regulations that are applicable to this project.

- Section 2-2-301 - Best Available Control Technology (BACT) Requirement: This rule requires that BACT be applied for each pollutant which is emitted in excess of 10.0 pounds per day.

- Section 2-2-302 - Offset Requirement, Precursor Organic Compounds and Nitrogen Oxides. This section applies to projects with an emissions increase of 50 tons per year or more of organic compounds and/or NO<sub>x</sub>. Offsets shall be provided at a ratio of 1.15 tons of emission reduction credits for each 1.0 ton of proposed project permitted emissions.
- Section 2-2-303 - Offset Requirements, Particulate Matter (TSP), PM<sub>10</sub> and Sulfur Dioxide: If a Major Facility (a project that emits any pollutant greater than 100 tons per year) has a cumulative increase of 1.0 ton per year of PM<sub>10</sub> or SO<sub>2</sub>, emission offsets must be provided for the entire cumulative increase at a ratio of 1.0:1.0.
- Emission reductions of nitrogen oxides and/or sulfur dioxide may be used to offset increased emissions of PM<sub>10</sub> at offset ratios deemed appropriate by the Air Pollution Control Officer.
- A facility which emits less than 100 tons of any pollutant may voluntarily provide emission offsets for all, or any portion, of their PM<sub>10</sub> or sulfur dioxide emissions increase at the offset ratio required above (1.0:1.0).
- Section 2-2-606 - Emission Calculation Procedures, Offsets. This section requires that emission offsets must be provided from the District's Emissions Bank, and/or from contemporaneous actual emission reductions.
- Rule 7-Acid Rain. This rule applies the requirements of Title IV of the federal Clean Air Act, which are spelled out in Title 40, Code of Federal Regulations, section 72. The provisions of section 72 will apply when EPA approves the District's Title IV program, which has not been approved at this time. The Title IV requirements will include the installation of continuous emission monitors to monitor acid deposition precursor pollutants.

## **Regulation 6**

Particulate Matter and Visible Emission. The purpose of this regulation is to limit the quantity of particulate matter in the atmosphere. The following two sections of Regulation 6 are directly applicable to this project:

- Section 301 - Ringelmann No. 1 Limitation: This rule limits visible emissions to no darker than Ringelmann No. 1 for periods greater than three minutes in any hour.
- Section 310 - Particulate Weight Limitation: This rule limits source particulate matter emissions to no greater than 0.15 grains per standard dry cubic foot.

## **Regulation 9**

### **Rule 1 - Limitations**

- Section 301: Limitations on Ground Level Sulfur Dioxide Concentration. This section requires that emissions of sulfur dioxide shall not impact at ground level in excess of 0.5 ppm for 3 consecutive minutes, or 0.25 ppm averaged over 60 minutes, or 0.05 ppm averaged over 24 hours.
- Section 302: General Emission Limitation. This rule limits the sulfur dioxide concentration from an exhaust stack to no greater than 300 ppm dry.

Rule 9 - Nitrogen Oxides from Stationary Gas Turbines. Effective January 1, 1997, this rule limits gaseous fired, SCR equipped, combustion turbines rated greater than 10 MW to 9 ppm@15%O<sub>2</sub>.

### **Regulation 10**

Rule 26 - Gas Turbines - Standards of Performance for New Stationary Sources. This rule adopts the national maximum emission limits (40 CFR 60) which are 75 ppm NO<sub>x</sub> and 150 ppm SO<sub>2</sub> at 15 percent O<sub>2</sub>. Whenever any source is subject to more than one emission limitation rule, regulation, provision or requirement relating to the control of any air contaminant, the most stringent limitation applies.

## **SETTING**

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### **CLIMATE AND METEOROLOGY**

The project is proposed to be located in the eastern part of San Francisco. The site is a few feet above sea level and is adjacent to the San Francisco Bay. The climate of the San Francisco area is dominated by a semi-permanent, high pressure system off the Pacific Coast, known as the Pacific High. During the summer months, the Pacific High extends to and often over the western United States, causing low pressure systems to pass north of the Pacific High into Canada. The relatively colder temperatures of the Pacific Ocean cause coastal stratus and fog to form. Brisk westerly winds blow throughout the afternoon and evening hours, which carry fog inland in the late afternoon and evening. The fog can often persist through mid-morning.

During the winter months, the Pacific High moves south, allowing low pressure systems to move through California. Cloud cover, precipitation, and generally strong winds prevail during this period.

About 80 percent of the average annual rainfall (approximately 20 inches) in the area occur between the months of November and March. Between storms, skies are fair, winds are light, and temperatures are moderate.

Temperatures in the general area of the site are moderated due to their proximity to the ocean and to the San Francisco Bay. The temperatures range from the mid-50s to low-70s in the summer, fall and spring, and from the mid-40s to low-60s during the winter.

Pacific Gas and Electric (PG&E) collects meteorological data at the project site. The data collected include wind directions, wind speed, temperature, and atmospheric stability class. The District has determined that the collected meteorological data are representative of the area's meteorology, and that it is appropriate to use for air quality dispersion modeling analysis for this project.

Quarterly wind roses, which are graphic representations showing wind speeds and directions based on data collected in 1992, are shown in Appendix A. At the project site, the winds blow predominately from the west from April through September. From October through February, the wind directions are more variable, with winds blowing predominately from the north, southeast and west.

Mixing heights in the area, which represent the altitudes to which different air masses mix together, have been estimated to range from a low of approximately 80 meters in the morning to a high of 2,300 meters in the afternoon. High mixing heights, normally associated with unstable conditions, can lead to greater dispersion of air contaminants (Smith et al. 1984). When the mixing height is low and the wind is calm, air contaminants can be trapped near the ground.

## EXISTING AMBIENT AIR QUALITY

The Federal Clean Air Act and the California Clean Air Act both require the establishment of standards for ambient concentrations of air pollutants, called ambient air quality standards (AAQS). The state AAQS, established by the Air Resources Board (ARB), are typically lower (more protective) than the federal AAQS, which are established by the federal Environmental Protection Agency (EPA). The state and federal air quality standards are listed in **AIR QUALITY Table 1**. As indicated in **AIR QUALITY Table 1**, the averaging times for the various air quality standards, the times over which they are measured, range from one-hour to an annual average. The standards are read as a concentration, in parts per million (ppm), or as a weighted mass of material per a volume of air, in milligrams or micrograms of pollutant in a cubic meter of air ( $\text{mg}/\text{m}^3$  and  $\mu\text{g}/\text{m}^3$ ).

In general, an area is designated as attainment if the concentration of a particular air contaminant does not exceed the standard. Likewise, an area is designated as non-attainment for an air contaminant if that contaminant standard is violated. Where not enough ambient data are available to support designation as either attainment or non-attainment, the area can be designated as unclassified. The unclassified area is normally treated the same as an attainment area for regulatory purposes. An area could be attainment for one air contaminant while non-attainment for another, or attainment for the federal standard and non-attainment for the state standard for the same air contaminant. The entire area within the boundaries of the air district is usually evaluated to determine the district's attainment status. The District includes all or portions of nine counties in the Bay



**AIR QUALITY Table 1**  
**Ambient Air Quality Standards**

Pollutant	Averaging Time	California Standards	Federal Standards	
			Primary	Secondary
Ozone(O <sub>3</sub> )	1-hour	0.09 ppm (180 µg/m <sup>3</sup> )	0.12 ppm (235 µg/m <sup>3</sup> )	Same as primary
Particulate Matter (PM <sub>10</sub> )	Ann.Geo. Mean	30 µg/m <sup>3</sup>	---	Same as primary
	24-hour	50 µg/m <sup>3</sup>	150 µg/m <sup>3</sup>	
	Ann.Arit. Mean	---	50 µg/m <sup>3</sup>	
Fine Particulate Matter (PM <sub>2.5</sub> )	24-hour	No separate standard	65 µg/m <sup>3</sup>	Same as primary
	Ann.Arit. Mean		15 µg/m <sup>3</sup>	Same as primary
Carbon Monoxide (CO)	1-hour	20 ppm (23 mg/m <sup>3</sup> )	35 ppm (40 mg/m <sup>3</sup> )	None
	8-hour	9 ppm (10 mg/m <sup>3</sup> )	9 ppm (10 mg/m <sup>3</sup> )	
Nitrogen Dioxide (NO <sub>2</sub> )	1-hour	0.25 ppm (470 µg/m <sup>3</sup> )	---	Same as primary
	Ann.AritMean	---	0.053 ppm (100 µg/m <sup>3</sup> )	
Lead(Pb)	30-day	1.5 µg/m <sup>3</sup>	---	Same as primary
	Cal. Quarter	---	1.5 µg/m <sup>3</sup>	
Sulfur Dioxide (SO <sub>2</sub> )	Ann.Arit. Mean	---	0.03 ppm (80 µg/m <sup>3</sup> )	---
	24-hour	0.04 ppm (105 µg/m <sup>3</sup> )	0.147 ppm (365 µg/m <sup>3</sup> )	---
	3-hour	---	---	0.5 ppm (1300 µg/m <sup>3</sup> )
	1-hour	0.25 ppm (655 µg/m <sup>3</sup> )	---	---
Sulfates	24-hour	25 µg/m <sup>3</sup>	No federal standard	
H <sub>2</sub> S	1-hour	0.03 ppm (42 µg/m <sup>3</sup> )	No federal standard	

Source: California Air Resources Board

Area: all of San Francisco, San Mateo, Santa Clara, Alameda, Contra Costa, Napa and Marin Counties, and the southwest portion of Solano County and the southern portion of Sonoma County.

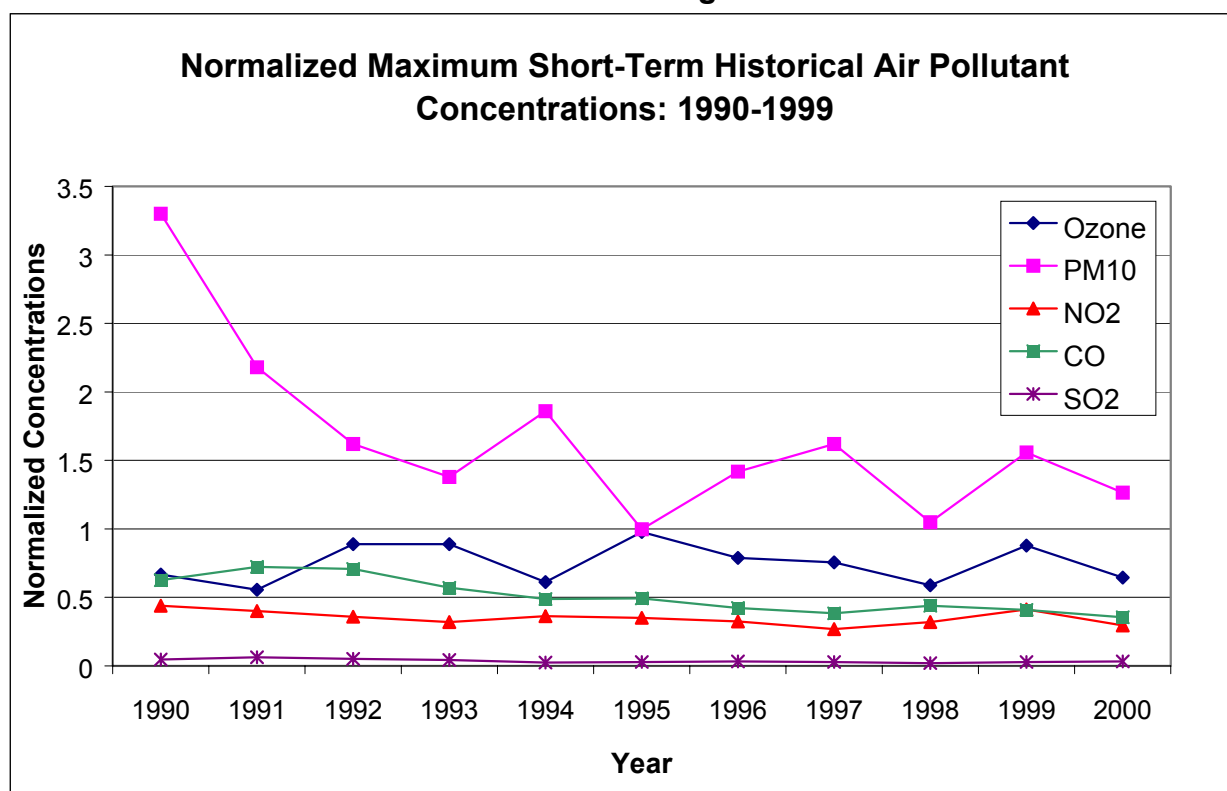
**AIR QUALITY Figure 1** summarizes the historical air quality data for the project location for PM<sub>10</sub>, CO, SO<sub>2</sub>, O<sub>3</sub>, and NO<sub>2</sub>. In **AIR QUALITY Figure 1**, the normalized concentrations represent the ratio of the highest measured concentrations in a given year to the most stringent applicable national or state ambient air quality standard.

Therefore, normalized concentrations lower than one indicate that the measured concentrations were lower than the most stringent ambient air quality standard. Based on the ambient concentration data collected, the area is consistently maintained below the most stringent ambient air quality standards for all criteria pollutants except for PM<sub>10</sub>. Below is an in-depth discussion of ambient air quality conditions in the Potrero area for ozone, NO<sub>2</sub>, CO and PM<sub>10</sub>.

## **OZONE**

Ozone is not directly emitted from stationary or mobile sources, but is formed as the result of chemical reactions in the atmosphere between directly emitted air pollutants. Nitrogen oxides and volatile organic compounds interact in the presence of sunlight to form ozone.

**AIR QUALITY Figure 1**

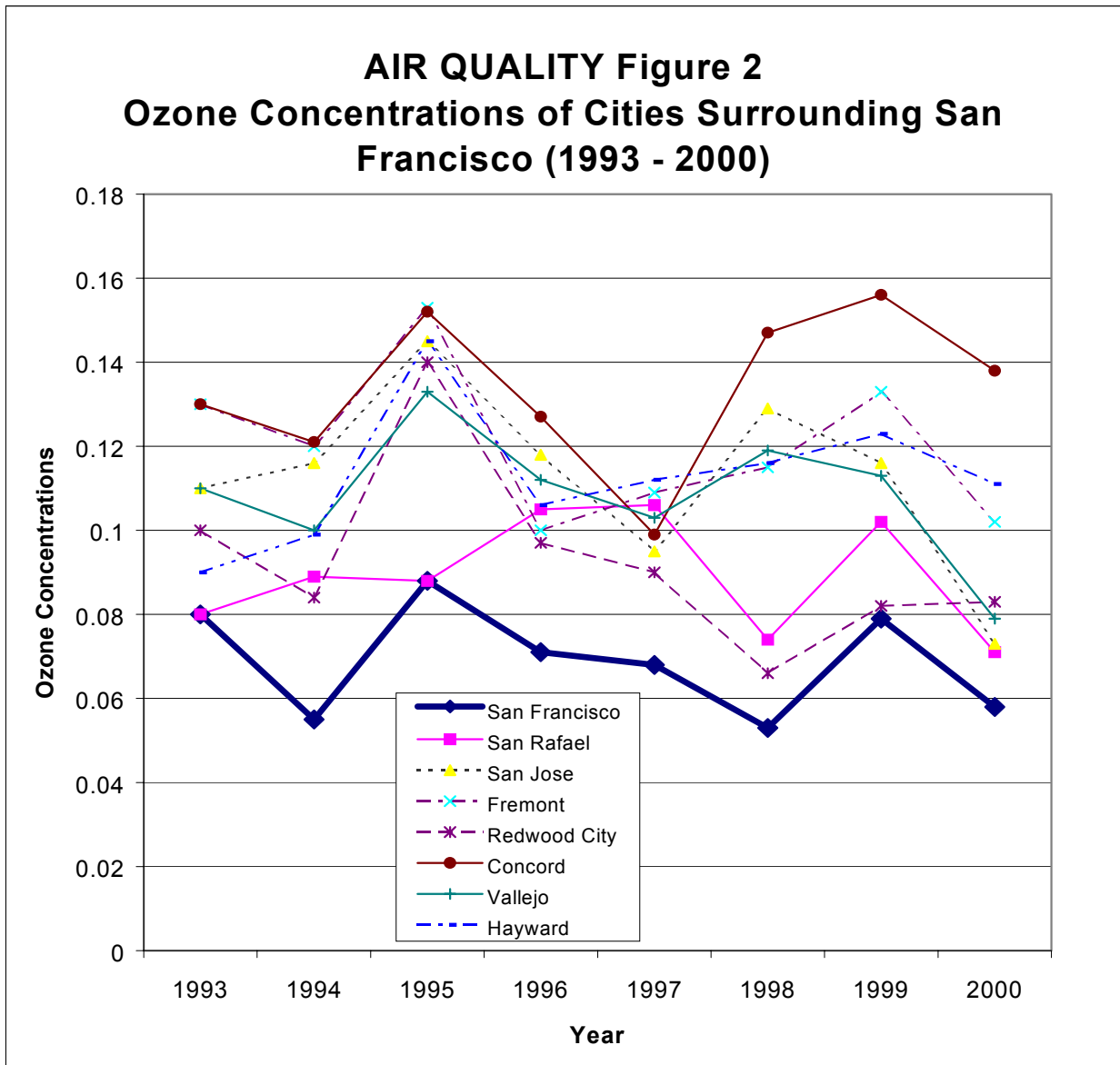


Source: Air Resources Board

The ambient ozone concentrations recorded between 1990 and 2000 have ranged from 5 to 9 parts per hundred millions (pphm). The area did not experience any violations of either the state or federal ozone air quality standards.

**AIR QUALITY Figure 2** represents the ozone concentrations of the area (between 1993 to 2000) compared to other cities surrounding the site. This figure shows that the area, during that time period, did not experience a violation of any ozone air quality standard. It also shows that the ambient ozone air quality is the cleanest among other surrounding cities.

## Nitrogen Dioxides (NO<sub>2</sub>)



NO<sub>2</sub> levels in Potrero are no more than half of the most stringent NO<sub>2</sub> ambient air quality standards, as shown in **AIR QUALITY Figure 1**. Approximately 90 percent of the NO<sub>x</sub> emitted from combustion sources is NO, while the balance is NO<sub>2</sub>. NO is oxidized in the atmosphere to NO<sub>2</sub>, but some level of photochemical activity is needed for this conversion. The highest concentrations of NO<sub>2</sub> typically occur during the fall and not in the winter when atmospheric conditions favor the trapping of ground level releases but lack significant photochemical activity (less sun light). In the summer the conversion rates of NO to NO<sub>2</sub> are high but the relatively high temperatures and windy conditions (atmospheric unstable conditions) disperse pollutants, preventing the accumulation of NO<sub>2</sub> to levels approaching the 1-hour ambient air quality standard.

### **Carbon Monoxide (CO)**

The highest CO concentration levels measured in Potrero are at least 30 percent lower than the most stringent California ambient air quality standards and are going to a slight downward trend (see **AIR QUALITY Figure 1**). The highest concentrations of CO occur

when low wind speeds and a stable atmosphere trap the pollution emitted at or near ground level in what is known as the stable boundary layer. These conditions occur frequently in the wintertime late in the afternoon, persist during the night and may extend one or two hours after sunrise. Since the mobile sector (cars, trucks, and buses) is the main source of CO, we expect ambient concentrations of CO to be highly dependent on emissions from the mobile sector.

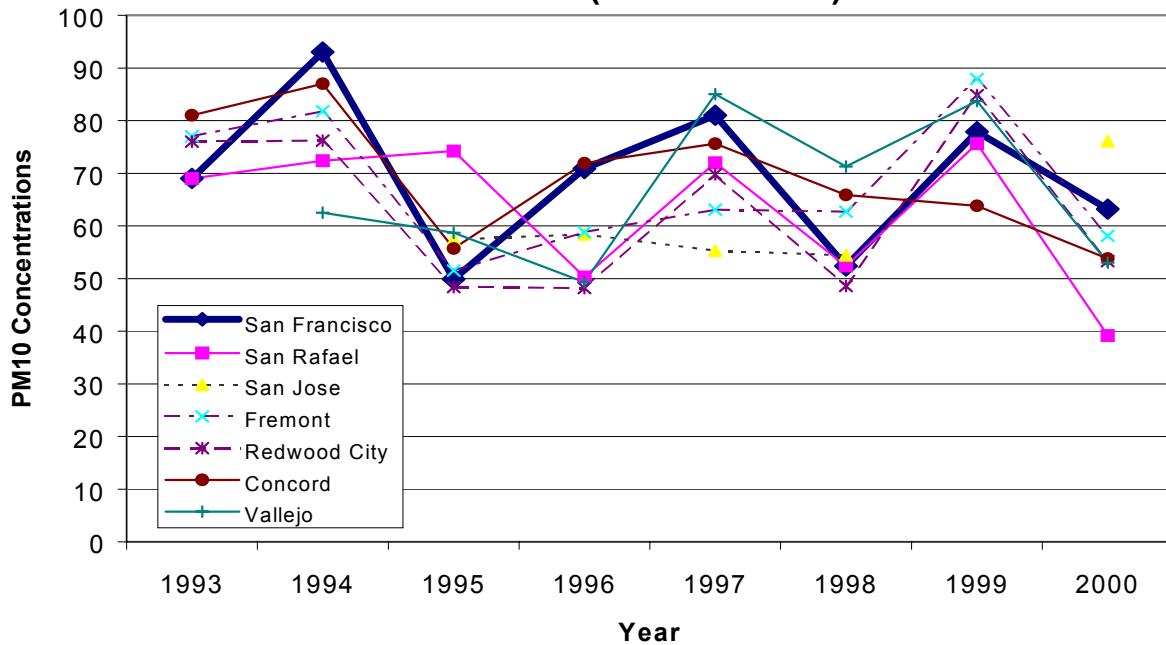
### **Particulate Matter (PM<sub>10</sub>)**

As shown in **AIR QUALITY Figure 1**, PM<sub>10</sub> concentrations measured at the site show a declining trend in the last ten years. The highest PM<sub>10</sub> concentrations are normally measured in the winter, especially during evening and night hours (BAAQMD, 2000). During wintertime high PM<sub>10</sub> episodes, the main sources of PM<sub>10</sub> contributions are wood smoke, combustion of fossil fuels, and entrained dust particles. On an annual basis, since 1995, the area has experienced one to six violations of the state 24-hour PM<sub>10</sub> air quality standard during late fall and early winter.

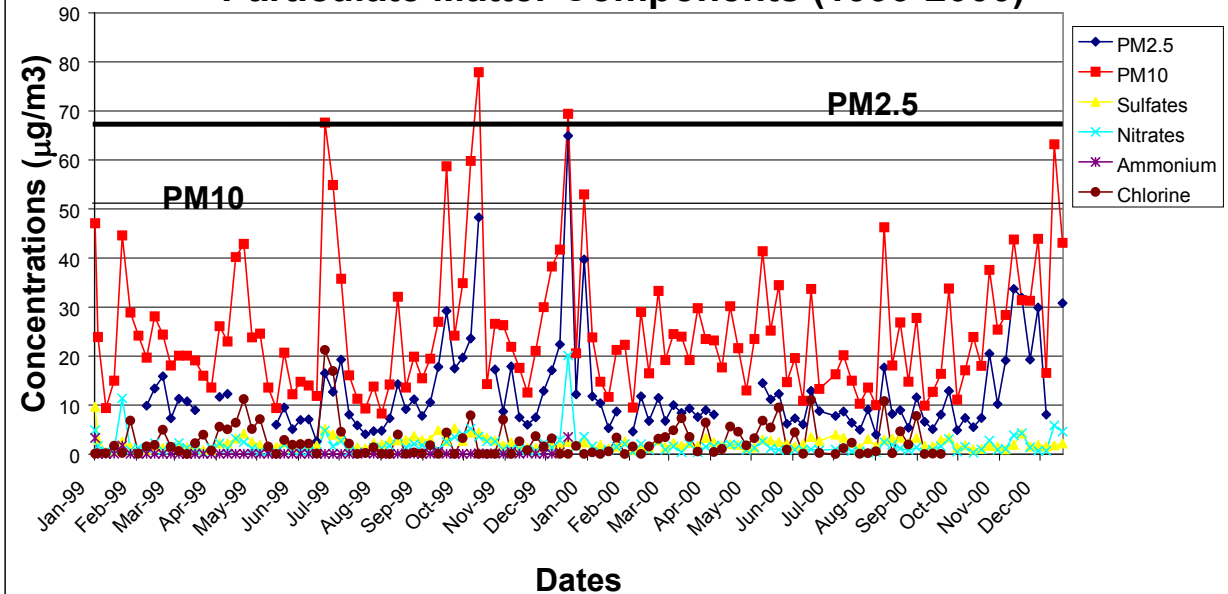
The latest ambient air quality data from the Air Resources Board (ARB) indicate that the state's 24-hour PM<sub>10</sub> standard measured in the area, for the partial year from January 1 to June 30, 2001, has been exceeded twice in January, twice in May and one time in June. Staff believes that the exceedance episodes are the direct result of the shortage in electricity, which force the operation of the older, more polluting electrical producing engines, the increase use of small diesel engines by private businesses, and the heating of homes with fuel other than natural gas and electric.

**AIR QUALITY Figure 3** represents the PM<sub>10</sub> concentrations of the area (between 1993 to 2000) compared to other cities surrounding the site. This figure shows that the area measured PM<sub>10</sub> concentrations correspond to at the same levels measured at the surrounding sites in the Bay area.

**AIR QUALITY Figure 3**  
**PM10 Concentrations of Cities Surrounding San Francisco (1993 - 2000)**



**AIR QUALITY Figure 4**  
**Particulate Matter Components (1999-2000)**



Source: Air Resources Board Ambient Air Quality Data.

**AIR QUALITY Figure 4** shows the highest measurements of PM<sub>10</sub>, PM<sub>2.5</sub> (particulate matters that are less than 2.5 microns in diameter) and particulates that are nitrates, sulfates, ammonium and chlorine based. These measurements were taken at the Arkansas Street monitoring station in 1999 and 2000. **AIR QUALITY Figure 4** shows that the PM<sub>2.5</sub> portion (which is generally caused by combustion processes from industrial, mobile sources and domestic activities) typically corresponds to and remains within 40 to 50 percent of the measured PM<sub>10</sub>. It should be noted, however, chlorine based particulate (sea salts) can account for between 3 to 30 percent of the ambient PM<sub>10</sub> measured. Staff believes that spray salts can influence the measured PM<sub>10</sub> due to the monitoring station location in proximity of the ocean.

### **Nitrates and Sulfates**

PM nitrate (mainly ammonium nitrate) is formed in the atmosphere from the reaction of nitric acid and ammonia. Nitric acid formed from NO<sub>x</sub> emissions originated from combustion sources. **AIR QUALITY Figure 4** shows that the nitrate ion concentrations during the winter time can range from 5 to 30 percent of the total PM<sub>10</sub> and could be a major contributor to PM<sub>2.5</sub>.

PM sulfate (mainly ammonium sulfate) is formed in the atmosphere from the oxidation of SO<sub>2</sub> and subsequent neutralization by ammonia in the atmosphere. The oxidation of SO<sub>2</sub> depends on many factors, which includes: the availability of hydroxyl (OH), hydroperoxy (HO<sub>2</sub>) and Methylperoxy (CH<sub>3</sub>OH), and humidity. **AIR QUALITY Figure 4** shows that the sulfate portion can range from 5 to 20 percent of the total PM<sub>10</sub> measured.

### **Fine Particulate Matter (PM<sub>2.5</sub>)**

**AIR QUALITY Figure 5** shows the PM<sub>2.5</sub> concentrations measured at various air quality monitoring stations in the Bay area during the period of December 1999 to December 2000. **AIR QUALITY Figure 5** shows that the PM<sub>2.5</sub> concentrations measured in San Francisco were among the lowest in all the counties of the Bay Area District air basin.

## **PROJECT EMISSIONS**

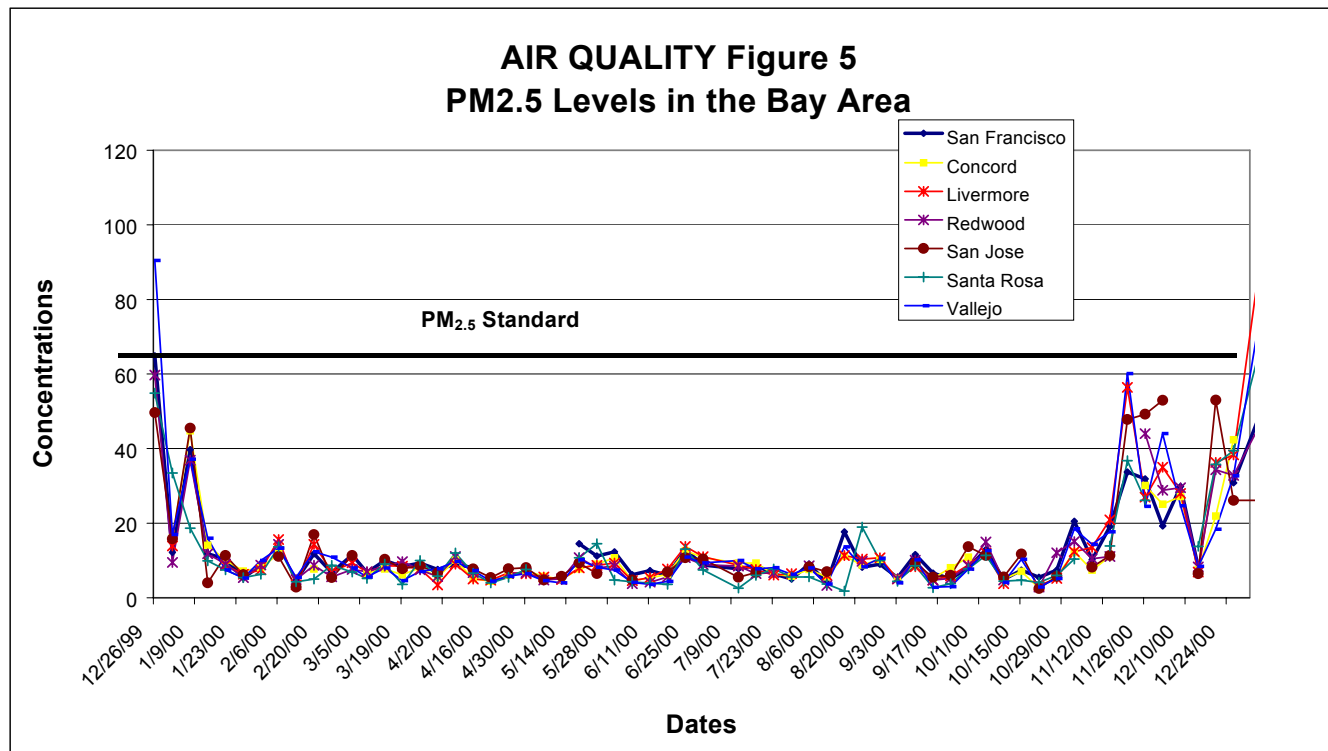
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### **CONSTRUCTION ACTIVITIES**

The construction of the proposed project, including the demolition of the existing Station A structures, will last approximately 24 months. The construction generally consists of three major activities: demolition of the existing building, site preparation, and construction and installation of major equipment and structures. All of these activities will result in fugitive dust emissions and construction equipment exhausts. The applicant provided estimated peak hourly, monthly and annual construction equipment exhaust emissions (SECAL, 2001a). These estimated construction emissions are identified in **AIR QUALITY Table 2**. Staff reviewed the applicant's estimated construction emissions, and believes that they are accurate.

Emissions from construction equipment exhausts, such as vehicles and internal combustion engines, are also expected during the project construction phase. A small

amount of hydrocarbon emissions may also occur as a result of the temporary storage of petroleum fuel at the site.



Source: Air Resources Board

**AIR QUALITY Table 2**  
**Construction Emissions**

Construction Emission Sources	NO <sub>x</sub>	SO <sub>2</sub>	VOC	CO	PM <sub>10</sub>
Hourly (lbs/hr)	35	3	4	14	1
Monthly (lbs/mo.)	7,120	650	740	2,750	194
Annual (tons/yr)	27	3	3	10	1
Fugitive Dust (tons/yr)					9

Sources: SECAL, 2001a. Amendment to AFC, Section 8.1.2.1 and Tables 8.1-8, January 19, 2001.

## PROJECT OPERATION

The project will be built with the following major components:

- Two natural gas fired, General Electric (GE) Frame 7FA combustion turbines,
- Two heat recovery steam generators (HRSG),
- One steam turbine.

The turbines will be operating in combined cycle mode to produce approximately 530 MW of electricity. The facility is expected to be between 75 to 85 percent available and can operate up to 8,684 hours per year. Each HRSG will be equipped with a 390

MMBTU/hr duct burner to increase steam production. The applicant proposes to equip each combustion turbine with a dry low NO<sub>x</sub> combustor and a selective catalytic reduction (SCR) system in the HSRG, which together limits the NO<sub>x</sub> emissions to 2.5 ppm@15% O<sub>2</sub>. To control the CO and VOC emissions, the applicant proposes to equip each combustion turbine/HRSG with a high-temperature oxidation catalyst system, which limits the CO emissions to 6 ppm and the VOC emissions to 2 ppm (SECAL, 2000a. AFC Table 8.1-26).

The applicant is requesting that the project be analyzed with the assumption of 28 cold-starts, 11 hot-starts and 39 shutdowns for both turbines each year (SECAL, 2000a. AFC Section 8.1.2.2). A hot start would occur after an overnight turbine shutdown. The duration of a hot start is approximately 90 minutes. A cold start takes considerably longer, as much as four and one-half hours. However, this type of start-up would be rare, occurring only after the turbines have been under extended shutdown, such as the annual maintenance inspection that the manufacturer may require.

The facility's hourly, daily and annual emissions were estimated based on information on the GE 7F turbines provided by the applicant, and are presented in **AIR QUALITY Tables 3 and 4**.

The daily and annual emissions from the project are shown in **AIR QUALITY Table 4**. The table shows different operating scenarios, and the resultant emissions, including CTG startup (cold and hot), shutdown, and steady state operation.

## **INITIAL COMMISSIONING**

The initial commissioning refers to a period of approximately 60 days prior to beginning commercial operation when the combustion turbines will undergo initial test firing. During this commissioning phase, the project may operate at a low-load for a long period of time for fine-tuning. The District typically requires that each activity of the commissioning period be planned carefully, and that all NO<sub>x</sub> and CO emissions and the time of commissioning be optimized to lessen the emissions from the turbines, duct burners and HRSG. It should also be noted that the NO<sub>x</sub> and CO emissions during the commissioning period are not higher than emissions during normal start up of the facility; therefore, staff expects no new impacts of the emissions during the commissioning period. All criteria air contaminant emissions during the commissioning period will be counted toward the annual emission limits; thus there is an incentive for the applicant to limit the commissioning period to the shortest time possible.

## **CLOSURE**

Eventually the facility will close, either as a result of the end of its useful life, or through some unexpected situation, such as a natural disaster or catastrophic facility breakdown. When the facility closes, all sources of air emissions will cease and all impacts associated with those emissions will no longer occur. The only other expected emissions will be fugitive particulate emissions from the dismantling activities. These activities will be short term and will create fugitive dust emissions levels much lower than those created during the construction of the project. Nevertheless, staff recommends that a facility closure plan be submitted to the Energy Commission



Compliance Project Manager (CPM) to demonstrate compliance with applicable District Rules and Regulations during closure activities.

**AIR QUALITY Table 3**  
**Project Hourly Emissions**  
 (pound per hour [lb/hr] except where noted)

<b>Operational Profile</b>	<b>NO<sub>x</sub></b>	<b>SO<sub>2</sub></b>	<b>PM<sub>10</sub></b>	<b>VOC</b>	<b>CO</b>
Cold Start-up (total emissions for 4.5 hours)	900	14	94	220	1,980
Hot Start-up (total emissions for 90 min.)	380	5	34	54	580
Shutdown (total emissions for 30 min.)	120	1	6	12	150
Steady State @ 100% load	40	6	26	11	60

Source: SECAL, 2000a. AFC Tables 8.1-9, 8.1-10.

**AIR QUALITY Table 4**  
**Project Daily and Annual Emissions**

<b>Operational Profile</b>	<b>NO<sub>x</sub></b>	<b>SO<sub>2</sub></b>	<b>PM<sub>10</sub></b>	<b>VOC</b>	<b>CO</b>
2 turbine sequential cold-start, hot start and steady state operation (maximum daily) (lbs/day)	2,000	125	600	470	3,640
Maximum steady state daily operation (lbs/day)	960	145	620	260	1,400
Maximum annual emissions including start ups and shutdown <sup>1</sup> (tons/year)	178	26	110	49	265

Notes: <sup>1</sup> Assume 4.5 hr for each cold start, 1.5 hr for each hot start, 14,180 hrs. steady state with duct burner and the rest at steady state without duct burner.

Source: SECAL, 2000a. AFC Tables 8.1-9 and 8.1-10.

## AMMONIA EMISSIONS

Due to the large combustion turbines used in this project and the need to control NO<sub>x</sub> emissions, significant amounts of ammonia will be injected into the flue gas stream as part of the SCR system. Not all of this ammonia will mix with the flue gases to reduce NO<sub>x</sub>; a portion of the ammonia will pass through the SCR and will be emitted unaltered, out the stacks. These ammonia emissions are known as ammonia slip. The applicant has committed to an ammonia slip no greater than 5 ppm (SEP2000Dres1). On a daily basis, a 5 ppm slip is equivalent to approximately 600 pounds of ammonia emitted into the atmosphere. Based on actual measurement of some similar equipment that are in operation, staff expects that an ammonia slip concentration of 1 ppm or less for the proposed facility. At this concentration, the ammonia emissions are approximately in the 100 to 200 lbm/day range.

## IMPACTS

Air dispersion models provide a means of predicting the location and magnitude of the air contaminant impacts of a new emissions source at ground level. These models

consist of several complex series of mathematical equations, which are repeatedly calculated by a computer for many ambient conditions. The model results are often described as a unit of mass per volume of air, such as micrograms per cubic meter ( $\mu\text{g}/\text{m}^3$ ). Each model result provides an estimate of the concentration of the pollutant emitted by the project that will occur at ground level.

The applicant has used an EPA-approved ISCST3 model to estimate the impacts of the project's  $\text{NO}_x$ ,  $\text{PM}_{10}$ , CO and  $\text{SO}_x$  emissions resulting from project construction and operation. A description of the modeling analyses and results are provided in Section 8.1.2.3 and Tables 8.1-15 to 8.1-17 of the AFC (SECAL, 2000a). Staff added the applicant's modeled impacts to the available highest ambient background concentrations measured during 1997 to 1999 at the Arkansas Street monitoring station. Staff then compared the results with the ambient air quality standards for each respective air contaminant to determine whether the project's emission impacts would cause a new violation of the ambient air quality standards or contribute to an existing violation.

Inputs for the modeling include stack information (exhaust flow rate, temperature, and stack dimensions), specific turbine emission data and meteorological data, such as wind speed, atmospheric conditions, and site elevation. For this project, the meteorological data used as inputs to the model included hourly wind speeds and directions measured at the project site.

## CONSTRUCTION IMPACTS

The results of the project construction impacts analyses are presented in **AIR QUALITY Table 5**. The modeling analyses included both the fugitive dust and vehicle exhaust emissions, which include  $\text{PM}_{10}$ ,  $\text{NO}_x$  and CO. In **AIR QUALITY Table 5**, the first and second columns list the air contaminant, i.e.,  $\text{NO}_2$ ,  $\text{PM}_{10}$ , and CO, and the averaging time for each air contaminant analyzed. The third and fourth columns present the project emission impacts and the highest measured concentration of the criteria air contaminants in the ambient air (background), respectively. The fifth column presents the total impact, i.e., the sum of project emission impact and background measured concentration.

As indicated in **Air Quality Table 5**, the project construction activities would further exacerbate existing violations of the state 24-hour  $\text{PM}_{10}$  standard, and thus constitute a significant air quality impact on  $\text{PM}_{10}$ . The project's construction activities would not create a new violation of the either  $\text{NO}_2$  or CO air quality standards, thus those impacts are not considered significant.

Staff believes that the  $\text{PM}_{10}$  impacts from the construction of the project can be further reduced with the implementation of the staff recommended construction mitigation measures, as discussed in the **Mitigation** section.

**AIR QUALITY Table 5**  
**Facility Maximum Construction Impacts**

Pollutants	Avg. Period	Impacts (µg/m <sup>3</sup> )	Background (µg/m <sup>3</sup> )	Total Impacts (µg/m <sup>3</sup> )	State Standards (µg/m <sup>3</sup> )	Percent of Standard
NO <sub>2</sub>	1-hr.	302	152	454	470	97%
CO	8-hr.	630	4,610	5,240	10,000	53%
PM <sub>10</sub>	24-hr.	27	81	108	50	220%

Source: SECAL, 2001a, AFC Amended page 8.149, Table 8.1-15.

## OPERATION IMPACTS

The applicant provided staff with a modeling analysis of the project's operating emissions impacts from directly emitted pollutants, which they believe demonstrates that no violations of ambient air quality standards will be caused by the operation of the project. Staff reviewed the applicant's modeling analysis and concludes that it is adequate.

**AIR QUALITY Table 6** presents the results of the modeling analysis using worst case hourly emissions, which include turbine start-up emissions as presented in **AIR QUALITY Table 4**. **AIR QUALITY Table 6** shows that, with the exception of PM<sub>10</sub>, the project does not cause any new violations of any applicable air quality standard even with worst case ambient concentrations recorded, and thus those impacts are not significant. As for PM<sub>10</sub>, staff believes that the project itself will contribute to existing violations of the state 24-hour PM<sub>10</sub> air quality standard. Therefore, the project's PM<sub>10</sub> emission impacts are significant.

## ENVIRONMENTAL JUSTICE

Census 2000 shows that the minority population is greater than fifty percent within a six-mile radius of the proposed Potrero Power Plant Unit 7 Project (please refer to Socioeconomics Figure 1 in this Staff Analysis). Census 1990 shows that the low-income population is less than fifty percent within the same radius. Staff has identified significant direct and cumulative impacts resulting from the construction and operation of the project, and therefore recommends that local mitigation measures (please refer to **Staff Recommended Additional PM<sub>10</sub> Mitigation** section) be provided to lessen or eliminate such impacts to a level of less than significant.

Staff has looked particularly hard at air quality mitigation because the applicant proposed offsets are not located where they would normally provide a benefit to the local area. Staff has required additional mitigation beyond offsets that will have significant and important community health benefits by reducing diesel emissions that are identified by the ARB to be toxic air contaminant. These air contaminants are emitted in the eastern part of the City on the ground level, where they are most likely to be inhaled.

**AIR QUALITY Table 6**  
**Worst Case Facility Emission Impacts on Ambient Air Quality**

Pollutants	Avg. Period	Impacts( $\mu\text{g}/\text{m}^3$ )	Background ( $\mu\text{g}/\text{m}^3$ )	Total Impacts ( $\mu\text{g}/\text{m}^3$ )	Standard ( $\mu\text{g}/\text{m}^3$ )	Percent of Standard
NO <sub>2</sub>	1-hour	110	152	262	470 <sup>1</sup>	56%
	Annual	0.7	39.5	40.2	100 <sup>2</sup>	40%
SO <sub>2</sub>	1-hour	8	96	104	655 <sup>1</sup>	15%
	24-hour	1.3	21.3	22.6	105 <sup>1</sup>	20%
CO	1-hour	520	8,270	8,800	23,000 <sup>1</sup>	40%
	8-hour	38	4,610	4,650	10,000 <sup>1</sup>	46%
PM <sub>10</sub>	24-hour	3	81	84	50 <sup>1</sup>	170%
	Annual	0.6	25	26	30 <sup>1</sup>	87%

Notes: All short-term (1-hour) ambient air quality impacts have been modeled as the impacts caused by the emissions during start-ups. All long-term (8-hour, 24 hour and annual) impacts are the impacts from the project caused by normal operations.

<sup>1</sup>State standards

<sup>2</sup>Federal standards

Source: SEP2000DRes1. Data Responses.

## **CUMULATIVE IMPACTS**

Staff's cumulative impact assessment is composed of two types of analyses. The first is an analysis of the project's directly emitted pollutants along with similar emissions from other foreseeable future projects that are currently under construction, or are currently under District review. The second is a discussion of the project's potential contribution to the formation of secondary pollutants, namely ozone and PM<sub>10</sub>.

## **DIRECTLY EMITTED POLLUTANT IMPACTS**

To evaluate the direct emission impacts of Unit 7 along with other probable future projects, staff needs specific information that is included when project applicants file an application with the District for a permit. Projects located up to six miles from the proposed facility usually need to be included in the analysis. Staff assumes that impacts from projects beyond six miles would not effect the modeling analysis on a cumulative basis. Staff received information from the District, which indicates that there are four sources that need to be included in the cumulative impact analysis. These sources are the Potrero Units 3-6, Mission Valley Rock, Hunters Point Power Plant, and Southeast Treatment Plant. Note that the Potrero Units 3-6 and the Hunters Point power plants are existing facilities that could potentially increase their power production rates above and beyond their normal operational capacity. Therefore, their potential emission increases will be analyzed for cumulative impacts to the area.

Staff located a City and County of San Francisco decision of approval (through the Port Commission Resolution 01-44) the Bode Gravel and Mission Valley Rock lease at Pier 92. In support of this document is the Southern Waterfront Final Supplemental Environmental Impact Report (SEIR), which analyzed a cumulative impacts of the following sources:

- Bode Gravel Company,

- Mission Valley Rock,
- RMC Pacific,
- British Pacific Aggregates/Hanson Aggregate,
- ISG Resources,
- Coach USA,
- Waste Management Inc. proposed construction waste recycling,
- Muni Bus parking and repair facility,
- Mission Bay Development project, and
- City Department of Parking and Traffic Impound facility,
- Other projects approved or proposed on adjacent or nearby areas, including Mission Bay, Bayview Hunters Point, and the proposed expansion of the Potrero Power Plant (Unit 7).

The Port Commission finds that the development of the project, which includes all aforementioned sources, "... incorporates all feasible mitigation measures and has eliminated or substantially lessened all significant effects on the environment where feasible.". The Port Commission requires that the following mitigation measures be utilized to support their findings.

1. Each of the industry groups will utilize BACT, consistent with current regulations, to control PM<sub>10</sub> emissions,
2. Development of the projects listed shall be consistent with the City's Clean Air Program, which fosters, promotes and encourage the use of low or zero emissions by developing infrastructure to support the use of these vehicles.
3. Construction of the projects should employ best practices to minimize construction emissions.

Staff believes that the proposed conditions of certification for Unit 7 will be consistent with the recommendations of the Port Commission.

Staff reviewed the applicant provided cumulative impact analysis for NO<sub>2</sub> and PM<sub>10</sub> (SEP2000DRes2), which includes all the aforementioned sources. Staff believes that the cumulative impacts for other criteria pollutants such as CO and SO<sub>2</sub> are relatively minor, and therefore has not required such analysis. **AIR QUALITY Table 7** presents the results of the cumulative impacts analysis. The table is organized to show the location of the point where maximum impact is expected. The point of maximum impact is coordinated by the universal transverse mercator (UTM) in the true north and true east directions. The UTM north and east are depicted in the top two rows for each point of maximum impact of the NO<sub>2</sub> 1-hour, annual, and the PM<sub>10</sub> 24-hour and annual ambient air quality standards. Subsequent values under each of the air quality standard's column are the impacts from each individual sources (described above) as seen by the model. The sum of each source impact as seen by the model at the point of maximum impact is totaled. This result is added to the background concentration,

which then will be compared to the most stringent ambient air quality standard to verify whether significant cumulative impacts could occur from the operation of Unit 7.

**AIR QUALITY Table 7**  
**Summary of Cumulative Impacts on the Area**

		NO <sub>2</sub>		PM <sub>10</sub>	
		1-hour	Annual	24-hour	Annual
Location of maximum impact	UTM North	<b>4,178,300</b>	<b>4,176,817</b>	<b>4,178,795</b>	<b>4,178,847</b>
	UTM East	<b>552,950</b>	<b>555,608</b>	<b>554,599</b>	<b>554,599</b>
Potrero Unit 7 (µg/m <sup>3</sup> )		0	0.05	2.50	0.45
Potrero Units 3-6 (µg/m <sup>3</sup> )		0	0.15	9.72	1.00
Hunters Point Power Plant (µg/m <sup>3</sup> )		125	9.85	0	0.05
Mission Valley Rock (µg/m <sup>3</sup> )		0	0.04	0	0.01
SF Southeast Treatment Plant (µg/m <sup>3</sup> )		0	0.01	0	0
Cumulative Impacts (µg/m <sup>3</sup> )		125	10	12	1.5
Background (µg/m <sup>3</sup> )		152	39.5	81	25
Total Cumulative Impacts (µg/m <sup>3</sup> )		<b>277</b>	<b>50</b>	<b>93</b>	<b>26</b>
Ambient Air Quality Standards (µg/m <sup>3</sup> )		470	100	50	30
Percent of Ambient Air Quality Standards		60%	50%	190%	87%

Source: SEP2000DRes2. December 21, 2000 Response to Data Requests.

As seen from **AIR QUALITY Table 7**, the cumulative impacts of Unit 7 and all other potential sources did not cause any new violation of the 1-hour and annual NO<sub>2</sub> and the annual PM<sub>10</sub> standards, and thus those impacts are not significant. The proposed Unit 7 and other potential sources, operating at maximum permitted emissions, cumulatively add 12 µg/m<sup>3</sup> of PM<sub>10</sub> impact to the existing violation of the state 24-hour PM<sub>10</sub> standard. Therefore, the proposed project's cumulative PM<sub>10</sub> impact could be considered to be a significant cumulative impact.

## SECONDARY POLLUTANT IMPACTS

### Ozone impacts

The proposed project's gaseous emissions, primarily NO<sub>x</sub> and VOC, can contribute to the formation of ozone. There are air dispersion models that can be used to quantify ozone impacts, but they are only appropriate for use in regional air quality planning efforts where numerous sources are input into the model to determine the regional ozone impacts. There are no regulatory agency models approved for assessing single source ozone impacts. However, because of the known relationship of NO<sub>x</sub> and VOC emissions to ozone formation, staff believes that the emissions of NO<sub>x</sub> and VOC from Unit 7 do have the potential to contribute to higher ozone levels if not mitigated. Unit 7 NO<sub>x</sub> and VOC contribution to the regional ozone problem is not considered to be significant, because the applicant has proposed to purchase emission reduction credits

of NO<sub>x</sub> and VOC to fully trade off and mitigate for the emission increases by the proposed facility.

### **Secondary PM<sub>10</sub> impacts**

The project's NO<sub>x</sub>, VOC, NH<sub>3</sub> and SO<sub>x</sub> emissions can contribute to the formation of secondary PM<sub>10</sub>, namely organic condensable, nitrates, and sulfates particulate matter.

Not all hydrocarbons can form secondary PM<sub>10</sub>. Hydrocarbons with six or less carbon atoms in the chain will not participate in the formation of the carbon based PM<sub>10</sub>. The project's VOC emissions will be in the form of unburned natural gas, which is mostly methane and ethane, which contain only one to two carbon atoms. Thus the turbine exhaust is not expected to emit any significant amount of VOC that can participate in the formation of secondary PM<sub>10</sub>.

Concerning ammonium nitrate, staff believes that the project's ammonia emissions have a potential to contribute to the ammonium nitrate emissions, which may worsen the violations of the state 24-hour PM<sub>10</sub> standard. Available research (Spicer, 1982) indicates that the conversion of NO<sub>x</sub> to nitrate is approximately between 10 to 30 percent per hour in a polluted urban area where ozone and ammonia are present in sufficient amount to participate in the reaction. Assume a 30 percent NO<sub>x</sub> to nitrate conversion rate and a linear extrapolation of the project's PM<sub>10</sub> modeling results, staff has estimated that the NO<sub>x</sub> to nitrate impact from the project can be at a maximum 2 µg/m<sup>3</sup>. Because the area is non-attainment for the state 24-hr PM<sub>10</sub> standard, the ammonium nitrate contribution, although small, is significant without providing emission reductions as offsets.

Concerning sulfates as PM<sub>10</sub>, staff believes that the project will contribute to sulfate levels in the area, although in a very small amount. Currently, there are no agency (EPA or CARB) recommended models or procedures for estimating sulfate formation. Nevertheless, studies during the past two decades have provided data on the oxidation rates of SO<sub>2</sub>. The data from these studies can be used to approximate the conversion of SO<sub>2</sub> to particulate (typically about 0.01 to 1 percent per hour) with Gaussian dispersion models such as ISCST3. The model can be performed with and without chemical conversion (decay factor) and the difference corresponds to the amount of SO<sub>2</sub> that is converted to PM<sub>10</sub>. Because the project uses natural gas as fuel, very little SO<sub>2</sub> emissions will be emitted; thus the SO<sub>2</sub> to sulfates conversion modeling is not performed or needed. Nevertheless, staff still recommends that offsets, in the form of emission reductions, be provided to lessen the project's PM<sub>10</sub> contribution to the ambient air to a level of less than significant.

### **VISIBILITY IMPACTS**

The applicant has provided, as part of their PSD application to the District, a visibility impact analysis, which shows that the project is not expected to exceed any significant visibility impairment increment inside any nearby (point Reyes National Seashore) PSD Class I areas (SECAL, 2000a). Class I areas are areas of special national or regional value from a natural, scenic, recreational, or historic perspective.

## **APPLICANT'S PROPOSED MITIGATION**

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### **Construction Phase**

The applicant proposes that it would implement Best Available Control Measures (BACM) during construction of the project. These measures are listed below:

- Frequent watering of unpaved roads and disturbed areas (at least twice a day).
- Limit speed of vehicles on the construction areas to no more than 10 MPH.
- Employ tire washing and gravel ramps prior to entering a public roadway to limit accumulated mud and dirt deposited on the roads.
- Treat the entrance roadways to the construction site with soil stabilization compounds.
- Place sandbags adjacent to roadways to prevent run-off to public roadways.
- Install windbreaks at the windward sides of construction areas prior to the soil being disturbed. The windbreaks shall remain in place until the soil is stabilized or permanently covered.
- Employ dust sweeping vehicles at least twice a day to sweep the public roadways that are used by construction and worker vehicles.
- Sweep newly paved roads at least twice weekly.
- Limit on equipment idle times (no more than five minutes).
- Employ electric motors for construction equipment when feasible.
- Apply covers or dust suppressants to soil storage piles and disturbed areas that remain inactive over two weeks.
- Pre-wet the soil to be excavated during construction.
- Employ oxidizing soot filters on all large suitable off-road construction equipment with an engine rating of at least 100 bhp.

In addition, the applicant will maintain the construction emissions so that fugitive emissions will be limited by District rules to a maximum 20 percent opacity during any three minutes span. Because the construction emissions are short-term, the applicant has not proposed any emission reduction credits to offset the new emissions.

### **Operation Phase**

The applicant proposes to mitigate the emission increases from the proposed facility using a combination of clean fuel, emission control devices and emission reduction credits. The applicant proposes to use a combination of dry low-  $\text{NO}_x$  combustion design, Selective Catalytic Reduction (SCR) and high-temperature CO oxidation catalyst technology for each of the combined cycle turbine trains to minimize its  $\text{NO}_x$  and CO emissions. The proposed control devices are designed to maintain the turbine/duct burner emissions to 2.5 ppm  $\text{NO}_x$ , 6 ppm CO, and 2 ppm VOC (SECAL 2000a). The ammonia slip emissions (from unreacted ammonia in the SCR) will be maintained at 5 ppm or less. Natural gas will be the only fuel used, which will minimize



the project's PM<sub>10</sub> and SO<sub>x</sub> emissions. Below is a brief description of the emission control technologies that Unit 7 will employ.

### **Dry Low- NO<sub>x</sub> Combustors**

Over the last 20 years, combustion turbine manufacturers have focused their attention on limiting the NO<sub>x</sub> formed during combustion. Because of the expense and efficiency losses due to the use of steam or water injection in the combustor cans to reduce combustion temperatures and the formation of NO<sub>x</sub>, CTG manufacturers are presently choosing to limit NO<sub>x</sub> formation through the use of dry low- NO<sub>x</sub> technologies. In this process, firing temperatures remain somewhat low, thus minimizing NO<sub>x</sub> formation, while thermal efficiencies remain high.

### **Flue Gas Controls**

To further reduce the emissions from the combustion turbines before they are exhausted into the atmosphere, flue gas controls, primarily catalyst systems, will be installed in the HRSG. The applicant is proposing two catalyst systems: a selective catalytic reduction system (SCR) to reduce NO<sub>x</sub>, and an oxidizing system to reduce CO and VOC.

### **Selective Catalytic Reduction**

Selective catalytic reduction refers to a process that chemically reduces NO<sub>x</sub> by injecting ammonia into the flue gas stream, over a catalyst, in the presence of oxygen. The process is termed selective because the ammonia reducing agent preferentially reacts with NO<sub>x</sub> rather than oxygen, producing inert nitrogen and water vapor. The performance and effectiveness of SCR systems are related to operating temperatures, which may vary with catalyst designs. Flue gas temperatures from a combustion turbine typically range from 950 to 1100°F.

Catalysts generally operate between 600 to 750°F (ARB 1992), and are normally placed inside the HRSG where the flue gas temperature has cooled. At temperatures lower than 600°F, the ammonia reaction rate may start to decline, resulting in increasing ammonia emissions, called ammonia slip. At temperatures above about 800°F, depending on the type of material used in the catalyst, damage to some catalysts can occur. The catalyst material most commonly used is titanium dioxide, but materials such as vanadium pentoxide, zeolite, or a noble metal are also used. These newer catalysts (versus the older alumina-based catalysts) are resistant to fuel sulfur fouling at temperatures below 770°F (EPRI 1990).

Regardless of the type of catalyst used, efficient conversion of NO<sub>x</sub> to nitrogen and water vapor requires uniform mixing of ammonia into the exhaust gas stream. Also, the catalyst surface has to be large enough to ensure sufficient time for the reaction to take place.

The applicant proposes to use a combination of dry low-NO<sub>x</sub> combustor and an SCR system to produce a maximum NO<sub>x</sub> concentration exiting the HRSG stack of 2.5 ppm, corrected to 15 percent excess oxygen averaged over a 1-hour period.

## **Oxidizing Catalyst**

To reduce the turbine CO and VOC emissions, the applicant proposes to install an oxidizing catalyst similar in concept to catalytic converters used in automobiles. The catalyst is usually coated with a rare metal, such as platinum, which will oxidize unburned hydrocarbons and CO to water vapor and carbon dioxide (CO<sub>2</sub>). The CO catalyst is proposed to limit the CO concentrations to 6 ppm at 15 percent O<sub>2</sub>.

## **OFFSETS**

The proposed facility is required by the BAAQMD to provide offsets on an annual basis (tons per year (tpy)) for NO<sub>x</sub>, VOC, and PM<sub>10</sub> as shown in **AIR QUALITY Table 8**. The applicant has purchased emission reduction credits, in the form of District issued banking certificates, from sources of offsets located in Antioch, Martinez and San Leandro. The banking certificate #693, in the amount of 473.56 TPY of NO<sub>2</sub>, 125.88 TPY of VOC, and 321.9 TPY of SO<sub>2</sub>, was issued to Gaylord Container in Antioch for the shut down of boilers at the facility. Certificate # 694, in the amount of 299 TPY of NO<sub>2</sub>, 25 TPY of PM<sub>10</sub>, and 158.2 TPY of SO<sub>2</sub>, was issued to PG&E Avon-Martinez facility due to improvement of their equipment at the facility. Certificate #695, in the amount of 1.17 TPY of NO<sub>2</sub>, 0.17 TPY of SO<sub>2</sub>, and 4.2 TPY of PM<sub>10</sub> was issued to Hudson ICS in San Leandro due to improvement of equipment at their facility. In total, as presented in **AIR QUALITY Table 8**, 205 TPY of NO<sub>2</sub>, 57 TPY of VOC, 84.5 TPY of PM<sub>10</sub> and 78 TPY of SO<sub>2</sub> are dedicated by the applicant to mitigate the potential ozone and PM<sub>10</sub> impacts caused by the proposed Unit 7 (SEP2001DRes3).

The applicant has proposed the use of inter-pollutant offsets, i.e., use emission reduction credits of SO<sub>2</sub> to trade for part of the project's PM<sub>10</sub> emissions. The applicant has proposed a "3 to 1 ratio", i.e., for every pound of new PM<sub>10</sub> emissions from the proposed facility, three pounds of SO<sub>2</sub> are purchased to offset such increase (SEP2001DRes3). The District has accepted the applicant proposed SO<sub>2</sub> to PM<sub>10</sub> offset ratio.

**AIR QUALITY Table 8**  
**Maximum Annual NO<sub>2</sub>, VOC, and PM<sub>10</sub> Emissions and Offsets**

Pollutant	New Emissions (tpy)	Offset Ratio <sup>1</sup>	Offsets Required (tpy)	Proposed Offsets (tpy)
NO <sub>2</sub>	178	1.15:1	205	<b>205</b> (Cert. #694-PG&E Martinez/Avon-Martinez)
VOC	49	1:1	57	<b>51</b> (Cert. #693-Gaylord Container-Antioch) <b>5.3</b> (Cert. #694-PG&E Martinez/Avon-Martinez) <b>0.39</b> (Cert. #695-Hudson ICS-San Leandro)
PM <sub>10</sub>	110	1:1	84.5	<b>53.06</b> (Cert.#693-Gaylord Container-Antioch) <b>25</b> (Cert.#694-PG&E-Avon/Martinez) <b>6.44</b> (Cert.#695-Hudson ICS-San Leandro)
		3:1 (SO <sub>2</sub> : PM <sub>10</sub> )	78	<b>78</b> (Cert.#694 - PG&E-Avon/Martinez)

Notes: 1. Offset ratio as required by the BAAQMD.

## ADEQUACY OF PROPOSED MITIGATION MEASURES

### CONSTRUCTION PHASE MITIGATION

As mentioned earlier in the impact section, the construction of the project will cause PM<sub>10</sub> emissions that will add to the existing violations of the ambient PM<sub>10</sub> air quality standard. Therefore, the project PM<sub>10</sub> emission impacts due to construction of the project are significant. In addition to the applicant proposed construction mitigation measures, staff recommends that ultra-low sulfur diesel fuel be utilized for construction vehicles and equipment during the demolition of Building A and the construction phase of Unit 7. Staff believes that the implementation of the applicant proposed and staff recommended mitigation measures during construction of the facility will reduce the short-term impacts of NO<sub>2</sub> and PM<sub>10</sub> to a level of less than significant.

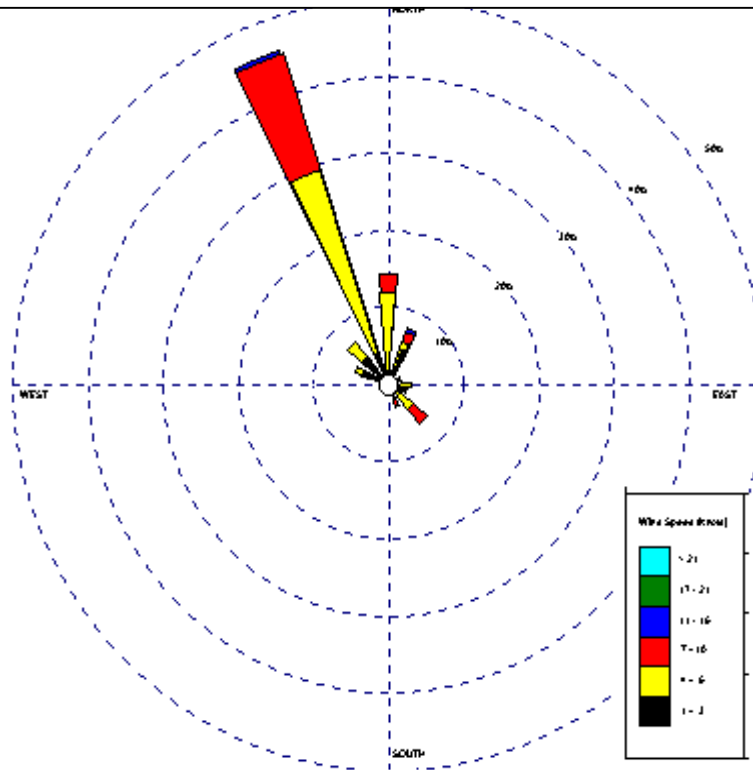
### OPERATIONAL PHASE MITIGATION

The project emissions will be fully offset, and will be built using BACT (clean burning using natural gas, SCR and CO oxidation catalyst systems) in accordance with the District NSR. The applicant has proposed an adequate amount of emission reduction credits to offset the facility's new NO<sub>x</sub>, VOC, SO<sub>2</sub> and PM<sub>10</sub> emissions as required by the District's Rules and Regulations. The project will not cause new violations of any NO<sub>2</sub>, SO<sub>2</sub>, or CO ambient air quality standards, and therefore, its NO<sub>x</sub>, SO<sub>x</sub> and CO emission impacts are not significant.

The project, however, will contribute to the occasional existing violations of the 24-hour PM<sub>10</sub> air quality standard in the area. The PM<sub>10</sub> offset package (84.5 TPY of PM<sub>10</sub> and 78 TPY of SO<sub>2</sub> from Antioch and Martinez area) is not likely to effectively mitigate the project's PM<sub>10</sub> contributions in the Potrero area, especially during the winter months

when the area experiences PM<sub>10</sub> violations. Staff reviewed the wind flow pattern (see **Air Quality Figure 5**) for the seven days when ambient air monitoring station in the area showed that there was a violation of the state 24-hour PM<sub>10</sub> standard. The wind flows in this period are from the North-Northwest. The offsets mitigation for PM<sub>10</sub> provided are from Antioch, which is located 30 miles northeast of the Potrero area. Staff therefore believes that there is a potential that the proposed offsets do not effectively mitigate the direct PM<sub>2.5</sub> and PM<sub>10</sub> emissions from the facility during winter when the area may experience a violation of the PM<sub>10</sub> standard. Staff recommends that additional direct PM<sub>2.5</sub> and PM<sub>10</sub> emission reduction credits acquired from the Potrero area be used as mitigation for the project's PM<sub>10</sub> emission impacts.

**AIR QUALITY Figure 5**  
**December 20-26 Wind Flow Pattern**



## **STAFF RECOMMENDED ADDITIONAL PM<sub>10</sub> MITIGATION**

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With the exception of the unusual 2001 year, the area experiences PM<sub>10</sub> violations for only a few days in the winter, during which the project PM<sub>10</sub> emissions have a potential to contribute to such violations. As mentioned earlier, staff believes that emission reductions from the local area must be obtained during that time period to mitigate such potential contribution to the ambient air. The project annual PM<sub>10</sub> emissions are 110 tons, thus the winter (three months) quarter PM<sub>10</sub> contribution from the project is 27.5 tons.

A review of the District emission reduction credits bank shows that there is no PM<sub>10</sub> emission reduction credit available in the Potrero area. Staff also conducted a survey for possible sources of PM<sub>10</sub> that have potential to generate emission reduction credits to mitigate the project PM<sub>10</sub> emissions, but found none.

Staff recommends that the applicant contribute one million dollars to the District's "Lower-Emission School Bus Particulate Matter Retrofit Program", which is described in the next section of the FSA. This would mitigate the project's direct and secondary PM<sub>10</sub> contribution to the wintertime PM<sub>10</sub> problem, which is approximately 27.5 tons.

Staff also recommends, as an alternative to the District's Lower-Emission School Bus Particulate Matter Retrofit Program", that the money contributed by the applicant be used to fund the construction of an ultra-low sulfur diesel refueling station or a natural gas refueling station. Both recommendations are consistent with the City Clean Air Program, and are essential to the success of the bus retrofit program.

### **HOW THE PROGRAM WORKS:**

The District is considering approval of approximately \$2.3 million to subsidize the purchase and installation of retrofit devices to reduce the PM<sub>10</sub> emissions from diesel school buses. Under this program, any Bay Area public school district that owns and operates school buses can apply for the full cost of a certified retrofitting device that can achieve at least 85 percent PM<sub>10</sub> emissions reduction. If interested, a participating school district submits an application to the District to receive a grant for retrofitting the buses. Once the grant is awarded, the school district can order the retrofit devices from qualified vendors. Upon complete installation of the devices, the school district would provide proof of installation, then a reimbursement would be made to the participating school district.

Staff recommends that the applicant contribute money to the District to expand the eligibility of the program, not only to school buses, but to any other private or public parties that operate a diesel fleet. According to the District staff, these operators can include Laidlaw, which leases school buses to the school districts, Muni transit, United Parcel Service and postal services, cement trucks, and Norcal Waste Services. The District staff has indicated that the District is interested in the concept and management of such program, pending approval from the District Government Board.

To generate 27.5 tons of PM<sub>10</sub> emission reduction credits, staff has estimated that approximately 125 buses can be retrofitted with the control devices at a cost of \$8,000

per device, installed. This would require the applicant to contribute one million dollars to the District's school bus retrofitting program (see Appendix B for the detailed calculations). Proper implementation of this program will generate enough PM<sub>10</sub> emission reduction credits. All of which are in the local area and at the ground level where inhalation is most likely. Thus the generated emission reduction credits will mitigate the project's direct PM<sub>10</sub> impacts in the area to a level of less than significant.

## **RESPONSE TO PUBLIC AND AGENCY COMMENTS ON THE PSA**

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**FL-1A:** *Potrero Unit 7 should not be licensed because Southeast San Francisco already has two power plants, two freeways, City sewer plant, industrial pollution and large volume of truck traffic.*

**Response:** The proposed Potrero Unit 7 is required to provide emission reduction credits, which are intended to mitigate the project contribution to the ambient air to a level of less than significant. In addition, Potrero Unit 7 has a potential to provide electrical power to the grid in sufficient quantity such that the operation of the existing dirtier units is no longer needed. Thus the operation of Unit 7 may have a benefit to the ambient air quality. As for emissions from trucks, staff recommendation for local emission reductions from diesel bus and trucks will result in less PM<sub>10</sub> and SO<sub>2</sub> emissions, which will mitigate the project's contribution to the local ambient air.

**FL-1B and FL-1C:** *Potrero Unit 7 should not be licensed because the site is too close to children and schools and a dense residential area across the street from the plant. The plant would release 625 tons of air pollution, which include 110 tons of soot and dust each year.*

**Response:** The proposed Potrero Unit 7 is required to provide emission reduction credits and local mitigation measure, which are intended to mitigate the project contribution to the ambient air to a level of less than significant.

**DB-1:** *The Potrero Unit 7 project should be evaluated for PM<sub>2.5</sub>; 110 tons of PM<sub>10</sub> is very high.*

**Response:** Throughout the staff analysis, staff has referred to all particulate matter emissions and offsets as PM<sub>10</sub> (particulate matter with a diameter less than 10 microns). The project's particulate matter emissions and offsets, with the exception of fugitive dusts from construction activities, are actually particulate matter of 2.5 microns or less. Therefore, staff has actually evaluated the project's particulate emissions and offsets as though they are PM<sub>2.5</sub>.

**DB-3:** *Staff's proposed diesel retrofitting mitigation will be of little use.*

**Response:** Staff disagrees with the commenter. The PM<sub>10</sub> air quality violations in the area only occur for a few days in the winter months. The District has conducted studies of the nature of the violations and believes that the violations are caused by residential activities, such as home heating, and vehicle traffic in the local area. Staff's

recommendation of securing emission reductions from diesel busses and trucks will directly mitigate the main source that causes the air quality problem in the area.

**DB-4:** *Staff's statement that the plant's emissions would be within limits, whether plant is in San Francisco or the desert is faulty.*

**Response:** Air Quality staff does not make such statement.

**KP-3:** *Using emission reduction credits as offsets does not protect the local residents.*

**Response:** Emission reduction credits are the emission reductions resulting from the over control or permanent shut down of a facility. To be qualified as emission reduction credits, these emission reductions must be actual and real, can be quantified, must be surplus and must be enforceable. In addition, they must be further discounted by the application of Reasonably Available Control Technology (RACT). In other words, only the emission reductions that are beyond the application of a reasonably control technology can be banked with the District for future use as offsets. Therefore, staff believes that emission reduction credits, when used correctly, is the best method to mitigate the project's emission impacts to local residents.

**KP-4:** *Staff's proposed mitigation regarding buses does not recognize and incorporate current initiatives to improve the air quality of southeast San Francisco and an end to court order school busing.*

**Response:** Staff's proposed mitigation does not limit school buses as the only source to be controlled for emission reduction credits. The fund that staff recommends the applicant to contribute to the District is to be used as an extension to the school bus program, which can be applied to diesel bus and truck fleet that is not qualified in the current program. In addition, the fund can also be used to built ultra low sulfur diesel fuel refueling station, which overall can reduce sulfur dioxide and particulate matter emissions from all trucks and buses that use diesel as fuel. Therefore, staff recommended mitigation would achieve a net improvement to the local ambient air quality.

**KR-1:** *Should the emissions from Unit 7 be vented so close to a hilltop community in-line with direct exposure.*

**Response:** Based on the available weather data, there will be a few days a year (no more than 10) the wind will blow from offshore to the hilltop community and carry with it some emissions from Unit 7. Staff believes that emissions that reach the hilltop community would be diluted significantly such that the impact would not be higher than the emissions from a residential natural gas cook top. In addition, the applicant will be required to provide emission reduction credits, which intend to reduce such impacts to a level of less than significant.

**CW-1:** *Staff need to investigate cleaner technology in the production of electricity including "Catalytica."*



**Response:** Catalytica develops Xonon™ Cool Combustion, which is a catalytic technology that combusts fuel flamelessly. This process releases the same amount of energy as flame-based combustion systems but at a lower temperature. Since NOx emissions depend heavily on the temperature of the flame, the lower temperature of the Xonon technology would result in lower NOx emissions. The Xonon combustion system is a pollution prevention technology that could limit emissions of NOx to less than 2.5 parts per million (ppm) without compromising the performance of the gas turbine engine. Staff believes that the Xonon Technology is not yet readily for commercial purpose.

**CW-2:** *Staff should investigate retrofitting of cement factory and Caltrain.*

**Response:** Staff has investigated the possibility of retrofitting cement factories in the Potrero and Bayview Hunters Point. The current factories have been required by the District to operate with very clean technology, which cannot be further control. As for Caltrain, only a portion of its operation is in the local area, thus reducing its emissions, even if it is achievable, may not effectively mitigate the project impacts to the local area.

**NS-1:** *Why not situate Unit 7 in the middle of nowhere where it cannot hurt anyone?*

**Response:** The main purpose of the staff air quality analysis is to investigate whether the project's emissions and impacts would likely cause significant impacts to the environment, and to recommend appropriate mitigation measures to lessen or eliminate such impacts. The project, as recommended by staff, will be required to provide emission reductions to lessen its impacts to a level of less than significant.

**GG/BD-1:** *PM<sub>10</sub> and other emissions must be reduced by applying the state of the art pollution controls during construction and operation.*

**Response:** The construction and operation of Unit 7 are required to be equipped with the most effective control mitigation measures. During construction period, the project is required to use best available control measures (see FSA page 21), and during operation of the project, the project is required to use best available control technology and provide additional local emission mitigation (see FSA pages 22 to 27).

**GG/BD-2:** *Emission reduction credits should not be allowed outside of the impact area.*

**Response:** Staff agreed. Staff has evaluated the project and identified that the project will cause significant impact to the area PM<sub>10</sub> violations. Staff also recommends that the project be mitigated with local contemporaneous emission reductions from the extended Buses Retrofitting Program.

## **THE CITY AND COUNTY OF SAN FRANCISCO (CCSF)**

**CCSF-3A:** *The PSA should be analyzed with ambient air quality data that are newer than 1999.*

**Response:** At the time the PSA prepared and published, the newest ambient air quality data available are for 1999. In this FSA, staff has provided ambient air quality data, which cover up to December 2000.

**CCSF-3A:** *Because the area ozone ambient air quality data is very close to the state 1-hour standard of 0.09 ppm, the addition of hundred of tons of NO<sub>x</sub> emissions from the proposed project is likely to change the pollutant concentration.*

**Response:** Beside the NO<sub>x</sub> emissions ozone ambient concentrations are affected by a variety of factors including the ambient concentrations of VOC, ozone, and the weather. Therefore, one cannot draw a direct, linear relationship between the NO<sub>x</sub> emissions and the ozone concentration in the local area. It should be noted that the applicant is required by the District Regulations to provide mitigation, in the form of emission reduction credits, in excess of the estimated NO<sub>x</sub> emissions of the proposed project. Thus, staff does not believe that the operation of the facility will result in a significant impact to the area's ambient ozone concentration.

**CCSF-3B:** *The CEC staff should evaluate the project's PM<sub>2.5</sub> emission impact.*

**Response:** Please see staff response to public comment **DB-1**.

**CCSF-3B:** *The PSA's **AIR QUALITY Figure 4** indicates that PM<sub>2.5</sub> standards are violated.*

**Response:** **AIR QUALITY Figure 4** shows that neither the area PM<sub>2.5</sub> 24-hour (65 µg/m<sup>3</sup>) nor the annual standard (15 µg/m<sup>3</sup>) is violated.

**CCSF-3C:** *AFC Table 8.1-15 indicates that the state 24-hour SO<sub>2</sub> standard will be violated; therefore, the project SO<sub>2</sub> construction impacts should be evaluated and appropriate mitigation should be provided.*

**Response:** The AFC Table 8.1-15 shows that the state 24-hour SO<sub>2</sub> standard will be violated as a result of the project construction; However, because construction activities last for 8 hours a day, the results from the modeling should be adjusted by a factor of 1/3 prior to be added to the ambient background SO<sub>2</sub> concentration. Using this method, the total impact of the project construction (background included) would be less than the state 24-hour SO<sub>2</sub> standard. It should also be noted that the construction equipment emissions were estimated using standard diesel fuel, which may contain up to 500 ppm sulfur. The project's construction equipment will be required to use ultra-low sulfur diesel fuel, which contains only 15 ppm sulfur. Thus the project construction SO<sub>2</sub> emission impacts will be much less than the estimated impacts provided in the AFC Table 8.1-15.

**CCSF-3E:** *Construction impacts should be mitigated.*

**Response:** Staff has recommended two conditions AQC-1 and AQC-2, which require that the emissions from construction activities be mitigated by using soot filter and ultra-low sulfur diesel fuel.

**CCSF-3F:** *The effects of Methane and CO<sub>2</sub> gas must be taken into account.*

**Response:** The staff air quality assesses the impacts of criteria air contaminant, i.e., those air contaminants that have a specific standard specified by the air regulatory agencies such as the USEPA or the state ARB. Methane and CO<sub>2</sub> are not criteria air contaminants.

**CCSF-3G:** *The cumulative impact analysis should take into account the proposed Potrero Unit 7, the Potrero Units 3-6, and the Hunters Point power plants. In addition, the PSA should include a map, which show the location of maximum impacts of each pollutants.*

**Response:** The staff PSA and FSA cumulative impact analyses do include simultaneous emissions from the Potrero Unit 7, Units 3-6, and the Hunters Point power plants.

The FSA includes a map (Appendix C) showing the locations of maximum impacts of each air contaminants analyzed.

**CCSF-3H, 3I:** *The proposed emission reduction credits are not satisfied, localized PM<sub>10</sub> is not mitigated by SO<sub>2</sub> emission reduction credits.*

**Response:** Staff agrees; therefore, staff recommends additional localized PM<sub>10</sub> emission reductions be obtained to mitigate the project's impacts.

**CCSF-3J:** *The PSA does not provide an analysis of emissions from the construction of the transmission line between the proposed project and the Hunters Point substation.*

**Response:** The PSA and the FSA construction emissions analyses do include the emissions from the proposed transmission line.

**CCSF-3K:** *Certification conditions that require the NO<sub>x</sub> emissions from the Otay Mesa be certified at 1 ppm level to be achieved within 20 years should also be required for the proposed Potrero Unit 7.*

**Response:** Staff recognizes that the conditions of certification for the Otay Mesa power plant be achieved at 1 ppm within 20 years from the date of the project operation. One should bear in mind that, just ten years ago, the lowest achievable NO<sub>x</sub> emission level for this type of gas turbine was approximately 9 ppm. Progress is being made continuously, so staff does not want to impose a condition that is not certain to achieve, and that could be used to prevent progress toward lower emission standard in the future.

**CCSF-3L:** *The staff suggested localized PM<sub>10</sub> emission reduction program from school buses is not adequate to mitigate the project PM<sub>10</sub> contribution.*

**Response:** The applicant has already been required by the District to obtain full emission reduction credit for each pound of NO<sub>x</sub>, VOC, SO<sub>2</sub> and PM<sub>10</sub>. The staff suggested additional localized PM<sub>10</sub> emission reduction program is intended to enhance

the District program, and was designed specifically to mitigate the wintertime PM<sub>10</sub> violations. In addition, staff has expanded the program to include all locally operated truck fleets, or the fund can be used to build ultra-low sulfur diesel fuel or natural gas refueling stations in the area. These stations will provide a lower emission fuel, which will reduce truck fleets' emissions in the local area. Therefore, the mitigation will be much more effective.

**CCSF-3M:** *The PSA does not have discussion regarding whether the certification of the proposed Potrero Unit 7 will comply with the Maxwell ordinance. In order for the project to conform with the Maxwell ordinance, the CEC staff should consider other mitigation measures such as: funding for additional compressed natural gas (CNG) stations, electric vehicles recharging stations, funding to support the conversion of MUNI buses or the city bus and truck fleet to CNG or electric.*

**Response:** The Maxwell Ordinance specifically requires "... all City officials and departments to advocate these requirements, ..., in regulatory proceedings and negotiations regarding the proposal to build a new power plant at the site...". As written, the ordinance would only affect the City officials and departments to advocate and negotiate such requirements for the proposed Unit 7.

**CCSF-3N:** *The City requests that the applicant funds the operation of an air quality monitoring station. The purpose of which is to find the baseline air quality data, and to restrict future operation of the Potrero Unit 7 if the ambient air quality exceed the measured baseline.*

**Response:** Staff believes that the existing monitoring station is adequate to show the environment setting of the local area.

Staff does not agree with the City suggestion that the new monitoring data be used as a baseline, which could be used to restrict the operation of the proposed project because:

- The monitoring data can be significantly different from one year to the next depending on the weather pattern, but not on the operation of the proposed Unit 7.
- There is no scientific assurance that the year chosen as the baseline is actually representing the baseline ambient concentration of the area; therefore, the operation of the proposed Unit 7 may be unfairly restricted.

## COMPLIANCE WITH LORS

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### FEDERAL

The applicant has submitted to the District an application for the federal PSD permit. The District has issued a Final Determination of Compliance (FDOC) on December 6, 2001, which includes the demonstration of compliance with the federal PSD requirements. [However, the final PSD permit will not be issued until the applicant has demonstrated compliance with the Federal Endangered Species Act.] Staff has incorporated the District's recommended Conditions into the Final Staff Assessment.

In addition, the applicant is required to submit an application to the District for a significant revision to the existing Major Facility Review Permit (Title V) prior to commencing operation. The applicant is also restricted from commencing operation unless a Title IV Permit has been issued, or 24 months after submitting an acid rain application (Title IV) to the District, whichever is earlier. Compliance with both of these federal titles will be determined at a later date.

## STATE

The project, with the anticipated full mitigation (offsets) that will be necessary for the project to secure a Determination of Compliance from the District, will comply with Section 41700 of the California Health and Safety Code. The project will be fully mitigated and therefore would not cause any injury, detriment, nuisance or annoyance to the public.

## LOCAL

The District has issued a FDOC (December 6, 2001), which states that the proposed project is expected to comply with all applicable District rules and regulations, and that offsets will be provided prior to the issuance of the project Authority to Construct permit.

## CONCLUSIONS AND RECOMMENDATIONS

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Unit 7 emissions of NO<sub>x</sub>, SO<sub>2</sub> and CO will not cause a violation of any NO<sub>2</sub>, SO<sub>2</sub> or CO ambient air quality standards; therefore, their impacts are not significant.

The project's air quality impacts from directly emitted PM<sub>10</sub> and of the ozone precursor emissions of NO<sub>x</sub> and VOC and PM<sub>10</sub> precursors of NO<sub>x</sub> and SO<sub>2</sub> could be significant if left unmitigated. The applicant will reduce emissions to the extent feasible by using Best Available Control Technology, and will provide emission offsets for the project's NO<sub>x</sub>, VOC, and PM<sub>10</sub> emissions. These mitigation measures satisfy the District requirements and reduce the potential for ozone and secondary PM<sub>10</sub> formation to a level of insignificance.

The direct PM<sub>10</sub> emission impacts to the local area should also be reduced to a level of less than significant if the applicant provides monetary funds to the District for use in retrofitting existing diesel fueled trucks and buses fleets or to build natural gas or ultra-low sulfur diesel refueling stations. Staff recommends the inclusion of Condition of Certification **AQC-3** to address the staff recommended PM<sub>10</sub> mitigation program.

The District has provided a Final Determination of Compliance, which staff has incorporated the conclusion and appropriate conditions into the FSA. The District recommended conditions are presented here as Conditions 1 through 47. Staff also recommends the inclusion of two Conditions of Certification **AQC-1** and **AQC-2** to address the construction-related impacts.

## CONDITIONS OF CERTIFICATION

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### **Definitions:**

Clock Hour:	Any continuous 60-minute period beginning on the hour.
Calendar Day:	Any continuous 24-hour period beginning at 12:00 AM or 0000 hours.
Year:	Any consecutive twelve-month period of time
Heat Input:	All heat inputs refer to the heat input at the higher heating value (HHV) of the fuel, in Btu/scf.
Rolling 3-hour period:	Any three-hour period that begins on the hour and does not include start-up or shutdown periods.
Firing Hours:	Period of time during which fuel is flowing to a unit, measured in fifteen-minute increments.
MM Btu:	million British thermal units
Gas Turbine Start-up Mode:	The lesser of the first 256 minutes of continuous fuel flow to the Gas Turbine after fuel flow is initiated or the period of time from Gas Turbine fuel flow initiation until the Gas Turbine achieves two consecutive CEM data points in compliance with the emission concentration limits of conditions 27(b) and 27(d).
Gas Turbine Shutdown Mode:	The lesser of the 30 minute period immediately prior to the termination of fuel flow to the Gas Turbine or the period of time from non-compliance with any requirement listed in Conditions 27(b) through 27(d) until termination of fuel flow to the Gas Turbine.
Specified PAHs:	<p>The polycyclic aromatic hydrocarbons listed below shall be considered to Specified PAHs for these permit conditions. Any emission limits for Specified PAHs refer to the sum of the emissions for all six of the following compounds.</p> <p>Benzo[a]anthracene Benzo[b]fluoranthene Benzo[k]fluoranthene Benzo[a]pyrene Dibenzo[a,h]anthracene Indeno[1,2,3-cd]pyrene</p>
Corrected Concentration:	The concentration of any pollutant (generally NO <sub>x</sub> , CO, or NH <sub>3</sub> ) corrected to a standard stack gas oxygen concentration. For emission point P-55 (combined exhaust of S-55 Gas Turbine and S-56 HRSG duct burners) and emission point P-57 (combined exhaust of S-57 Gas Turbine and S-58 HRSG duct burners) the standard stack gas oxygen concentration is 15% O <sub>2</sub> by volume on a dry basis.
Commissioning Activities:	All testing, adjustment, tuning, and calibration activities recommended by the equipment manufacturers and the Potrero PP Unit#7 construction contractor to insure safe and reliable steady state operation of the gas turbines,

	heat recovery steam generators, steam turbine, and associated electrical delivery systems.
Commissioning Period:	The Period shall commence when all mechanical, electrical, and control systems are installed and individual system start-up has been completed, or when a gas turbine is first fired, whichever occurs first. The period shall terminate when the plant has completed performance testing, is available for commercial operation, and has initiated sales.
Precursor Organic Compounds (POCs):	Any compound of carbon, excluding methane, ethane, carbon monoxide, carbon dioxide, carbonic acid, metallic carbides or carbonates, and ammonium carbonate
CPM:	California Energy Commission Compliance Project Manager
Potrero PP Unit#7:	Potrero Power Plant Unit 7

**AQCEC-1** During construction of this facility, the following fugitive emission control measures shall be implemented at the plant site:

- a. Suspend all land clearing, grading, earth moving, or excavation activities when winds (including instantaneous gusts) exceed 20 miles per hour.
- b. Apply water to active construction sites and unpaved roads at least twice daily to control fugitive dust.
- c. Apply sufficient water or dust suppressants to all material excavated, stockpiled, or graded to prevent fugitive dust from leaving the property boundaries and causing a public nuisance or a violation of an ambient air standard.
- d. Apply a non-toxic solid stabilizer to all inactive construction areas (previously graded areas which remain inactive for 96 hours).
- e. No on-site vehicle shall exceed a speed of 10 miles per hour on unpaved roads or areas.
- f. All trucks hauling dirt, sand, soil, or other loose material will be watered or covered and will maintain at least two feet of freeboard to prevent a public nuisance.
- g. Install wheel washers where vehicles enter and exit unpaved roads onto paved roads, or wash off trucks and any equipment leaving the site each trip.
- h. Sweep streets with a water sweeper at the end of each day if visible soil materials are carried onto adjacent public or private paved roads.
- i. Re-establish ground cover on the construction site through seeding and watering as soon as possible, but no later than final occupancy.
- j. Implement all dust control measures in a timely and effective manner during all phases of project development and construction.
- k. Place sandbags adjacent to roadways to prevent run off to public roadways.
- l. Install wind breaks at the windward sides of construction areas prior to the soil being disturbed. The wind breaks shall remain in place until the soil is stabilized or permanently covered.
- m. Limit construction vehicles and equipment idle time to no more than 5 minutes.

- n. Use of electricity to power, to the extent practical, construction equipment.

**Verification:** The project owner shall maintain a daily log of water truck activities, including records of the frequency of public road cleaning and area(s) that are covered or treated with dust suppressants. These logs and records shall be available for inspection by the CPM during the construction period. The project owner shall make the construction site available to the District staff and the CPM for inspection and monitoring.

**AQCEC-2** The project owner shall mitigate, to the extent practical, construction related emission impacts from off-road, diesel-fired construction equipment. Available measures which may be used to mitigate construction impacts include the following:

- Catalyzed Diesel Particulate Filters (CDPF);
- Ultra-Low-Sulfur Diesel fuel, with a sulfur content of 15 ppm or less (ULSD);
- Diesel engines certified to EPA and CARB 1996 or newer off-road equipment emission standards.

Additionally, the project owner shall restrict idle time, to the extent practical, to no more than 10 minutes.

The use of each mitigation measure is to be determined in advance by a Construction Mitigation Manager (CMM), who will be available at the project site(s). The CMM must be approved by the CPM prior to the submission of any reports.

The CMM shall submit the following reports to the CPM for approval:

- Construction Mitigation Plan
- Reports of Change and Mitigation Implementation
- Reports of Emergency Termination of Mitigation, as necessary.

**Diesel Construction Equipment Mitigation Plan:**

The Construction Mitigation Plan shall be submitted to the CPM for approval prior to rough grading on the project site, and must include the following:

- A list of all diesel fueled, off-road, stationary or portable construction-related equipment to be used either on the project construction site or the construction sites of the related linear facilities. Equipment used less than a total of 10 consecutive days need not be included in this list.
- Each piece of construction equipment listed under item (1) must demonstrate compliance with the following mitigation requirements:

• Engine Size (BHP)	• 1996 CARB or EPA Certified Engine	• • Required Mitigation
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• < or =100	• Yes or No	• ULSD
• >100	• Yes	• ULSD
• >100	• No	• ULSD and CDPF, if suitable as determined by the CMM

- If compliance can not be demonstrated as specified under item (2), then the project owner may appeal for relief to the CPM. However, the owner must demonstrate that they have made a good faith effort to comply as specified under item (2).

### **Report of Change and Mitigation Implementation**

Following the initiation of construction activities, and if changes to mitigation measures are necessary, the CMM shall submit a Report of Change and Mitigation Implementation to the CPM for approval. This report must contain at a minimum the cause of any deviation from the Construction Mitigation Plan, and verification of any Construction Mitigation Plan measures that were implemented.

The following is acceptable proof of compliance, other methods of proof of compliance must be approved by the CPM.

- EPA or CARB 1996 off-road equipment emission standards:
- A copy of the certificate from EPA or CARB.
- Purchase and use of ultra-low-sulfur fuel (15 ppm or less).
- Receipt or other documentation indicating type and amount of fuel purchased, from whom, where delivered and on what date; **and**
- A copy of the text included in the contract agreement with all contractors and sub-contractors for use of the ultra-low-sulfur fuel in diesel burning construction equipment as identified in the Construction Mitigation Plan.
- Installation of CDPF:
- The suitability of the use of CDPFs is to be determined by a qualified mechanic or engineer who must submit a report to the CPM for approval.
- Installation is to be verified by a qualified mechanic or engineer.
- Construction equipment engine idle time:
- A copy of the text included in the contract agreement with all contractors and sub-contractors to keep engine idle time to 10 minutes or less to the extent practical.

### **Report of Emergency Termination of Mitigation**

- If a specific mitigation measure is determined to be detrimental to a piece of construction equipment or is determined to be causing significant delays in the construction schedule of the project or the associated linear facilities, the mitigation measure may be terminated immediately. However, notification containing an explanation for the cause of the termination must be sent to the CPM for approval.

All such causes are restricted to one of the following justifications and must be identified in any Report of Emergency Termination of Mitigation.

1. The measure is excessively reducing normal availability of the construction equipment due to increased downtime for maintenance, and/or power output due to an excessive increase in back pressure.
2. The measure is causing or is reasonably expected to cause significant engine damage.
3. The measure is causing or is reasonably expected to cause a significant risk to nearby workers or the public.
4. Any other seriously detrimental cause which has approval by the CPM prior to the change being implemented.

**Verification:** The project owner will submit to the CPM for approval the qualifications of the CMM at least 45 days prior to the due date for the Diesel Construction Equipment Mitigation Plan. The project owner will submit the Diesel Construction Equipment Mitigation Plan to the CPM for approval 30 calendar days prior to rough grading on the project site or start of construction on any associated linear facilities. The project owner will submit the Report of Change and Mitigation Implementation to the CPM for approval no later than 10 working days following the use of the specific construction equipment on either the project site or the associated linear facilities. The project owner will submit a Report of Emergency Termination of Mitigation to the CPM for approval, as required, no later than 10 working days following the termination of the identified mitigation measure. The CPM will monitor the approval of all reports submitted by the project owner in consultation with CARB, limiting the review time for any one report to no more than 20 working days.

**AQCEC-3** The project owner shall provide \$1 million to the Bay Area Air Quality Management District (District) to provide PM<sub>10</sub> and PM<sub>10</sub> precursor reductions in the Potrero/Hunters Point area. The fees shall be provided to the District, who in cooperation with CARB and the California Energy Commission (CEC), will allocate the funds to extend the Lower-Emission School Bus Particulate Matter Retrofit to include commercial and private truck and bus fleet operators in the local area. Alternatively, the money can also be used to subsidize construction of ultra low sulfur diesel or natural gas refueling stations.

**Verification:** Thirty (30) days after certification, the owner/operator shall provide the funds to the District Air Pollution Control Officer and copies of the payments shall be provided to the CPM 20 days after delivery of the deposit to the District.

**AQCEC-4** The project owner shall submit a copy of any proposed modifications to the Authority to Construct, Permit to Operate or any other permits issued by the local air quality management district or other regulatory agencies to the CPM for review and approval.

**Verification:** Within 5 days of any request to modify any District or other regulatory agency permit conditions, the project owner shall provide the CPM a copy of the proposed request for review and approval as necessary.

## CONDITIONS FOR THE COMMISSIONING PERIOD

**AQ-1.** The owner/operator of the Potrero PP Unit 7 shall minimize emissions of carbon monoxide and nitrogen oxides from S-55 and S-57 Gas Turbines and S-56 and S-58 Heat Recovery Steam Generators (HRSGs) to the maximum extent possible during the commissioning period. Conditions 1 through 12 shall only apply during the commissioning period as defined above. Unless otherwise indicated, Conditions 13 through 47 shall apply after the commissioning period has ended.

**Verification:** The owner/operator shall submit a monthly compliance report to the CPM. In this report the owner/operator shall indicate how this condition is being implemented.

**AQ-2.** At the earliest feasible opportunity in accordance with the recommendations of the equipment manufacturers and the construction contractor, the S-55 & S-57 Gas Turbine combustors and S-56 & S-58 Heat Recovery Steam Generator duct burners shall be tuned to minimize the emissions of carbon monoxide and nitrogen oxides.

**Verification:** The owner/operator shall submit a monthly compliance report to the CPM. In this report the owner/operator shall indicate how this condition is being implemented.

**AQ-3.** At the earliest feasible opportunity, in accordance with the recommendations of the equipment manufacturers and the construction contractor, the A-55 and A-57 SCR Systems and A-56 and A-58 CO Oxidation Catalyst Systems shall be installed, adjusted, and operated to minimize the emissions of carbon monoxide and nitrogen oxides from S-55 & S-57 Gas Turbines and S-56 & S-58 Heat Recovery Steam Generators.

**Verification:** The owner/operator shall submit a monthly compliance report to the CPM. In this report the owner/operator shall indicate how this condition is being implemented.

**AQ-4.** Coincident with the as designed operation of A-55 & A-57 SCR Systems, pursuant to conditions 3, 10, 11, and 12, the Gas Turbines (S-55 & S-57) and the HRSGs (S-56 & S-58) shall comply with the NO<sub>x</sub> and CO emission limitations specified in conditions 20(a) through 20(d).

**Verification:** The owner/operator shall submit a monthly compliance report to the CPM. In this report the owner/operator shall indicate how this condition is being implemented.

**AQ-5.** The owner/operator of the Potrero PP Unit#7 shall submit a plan to the District Permit Services Division and the CEC CPM at least four weeks prior to first firing of S-55 or S-57 Gas Turbines describing the procedures to be followed during the commissioning of the gas turbines and HRSGs. The plan shall include a description of each commissioning activity, the anticipated duration of each activity in hours, and the purpose of the activity. The activities described shall include, but not be limited to, the tuning of the Dry-Low-NO<sub>x</sub> combustors, the installation and operation of the SCR systems and oxidation catalysts, the installation, calibration, and testing of the CO and NO<sub>x</sub> continuous emission monitors, and any activities requiring the firing of the Gas Turbines (S-55 & S-57) and HRSGs (S-56 & S-58) without abatement by their respective SCR and CO Catalyst Systems.

**Verification:** The owner/operator shall submit a monthly compliance report to the CPM. In this report the owner/operator shall indicate how this condition is being implemented.

**AQ-6.** During the commissioning period, the owner/operator of the Potrero PP Unit#7 shall demonstrate compliance with conditions 8 through 11 through the use of properly operated and maintained continuous emission monitors and data recorders for the following parameters:

- firing hours for each gas turbine and each HRSG
- fuel flow rates to each train
- stack gas nitrogen oxide emission concentrations at P-55 and P-57
- stack gas carbon monoxide emission concentrations P-55 and P-57
- stack gas carbon dioxide concentrations P-55 and P-57

The monitored parameters shall be recorded at least once every 15 minutes (excluding normal calibration periods or when the monitored source is not in operation) for the Gas Turbines (S-55 & S-57) and HRSGs (S-56 & S-58). The owner/operator shall use District-approved methods to calculate heat input rates, NO<sub>x</sub> mass emission rates, carbon monoxide mass emission rates, and NO<sub>x</sub> and CO emission concentrations, summarized for each clock hour and each calendar day. All records shall be retained on site for at least 5 years from the date of entry and made available to District personnel upon request.

**Verification:** The owner/operator shall submit a monthly compliance report to the CPM. In this report the owner/operator shall indicate how this condition is being implemented.

**AQ-7.** The District-approved continuous emission monitors specified in condition 5 shall be installed, calibrated, and operational prior to first firing of the Gas Turbines (S-55 & S-57) and Heat Recovery Steam Generators (S-56 & S-58). After first firing of the turbines and auxiliary boilers, the detection range of these continuous emission monitors shall be adjusted as necessary to accurately measure the resulting range of CO and NO<sub>x</sub> emission concentrations. The type, specifications, and location of these monitors shall be subject to District review and approval.

**Verification:** The owner/operator shall submit a monthly compliance report to the CPM. In this report the owner/operator shall indicate how this condition is being implemented. In addition, the owner/operator shall provide evidence(s) of the District approval of the emission monitoring system to the CPM prior to first firing of the gas turbines.

**AQ-8.** The total number of firing hours of S-55 Gas Turbine and S-56 Heat Recovery Steam Generator without abatement of nitrogen oxide emissions by A-55 SCR System and/or A-56 Oxidation Catalyst System shall not exceed 500 hours during the commissioning period. Such operation of S-55 Gas Turbine and S-56 HRSG without abatement shall be limited to discrete commissioning activities that can only be properly executed without the SCR or Oxidation Catalyst Systems fully operational. Upon completion of these activities, the owner/operator shall provide

written notice to the District Permit Services and Enforcement Divisions and the unused balance of the 500 firing hours without abatement shall expire.

**Verification:** The owner/operator shall submit a monthly compliance report to the CPM. In this report the owner/operator shall indicate how this condition is being implemented.

**AQ-9.** The total number of firing hours of S-57 Gas Turbine and S-58 Heat Recovery Steam Generator without abatement of nitrogen oxide emissions by A-57 SCR System and/or A-58 Oxidation Catalyst System shall not exceed 500 hours during the commissioning period. Such operation of S-57 Gas Turbine and S-58 HRSG without abatement shall be limited to discrete commissioning activities that can only be properly executed without the SCR or Oxidation Catalyst Systems fully operational. Upon completion of these activities, the owner/operator shall provide written notice to the District Permit Services and Enforcement Divisions and the unused balance of the 500 firing hours without abatement shall expire.

**Verification:** The owner/operator shall submit a monthly compliance report to the CPM. In this report the owner/operator shall indicate how this condition is being implemented.

**AQ-10.** The total mass emissions of nitrogen oxides, carbon monoxide, precursor organic compounds, PM<sub>10</sub>, and sulfur dioxide that are emitted by the Gas Turbines (S-55 & S-57) and Heat Recovery Steam Generators (S-56 & S-58) during the commissioning period shall accrue towards the consecutive twelve-month emission limitations specified in condition 24.

**Verification:** The owner/operator shall submit a monthly compliance report to the CPM. In this report the owner/operator shall provide the accrued emissions and shall indicate how this condition is being implemented.

**AQ-11.** Combined pollutant mass emissions from the Gas Turbines (S-55 & S-57) and Heat Recovery Steam Generators (S-56 & S-58) shall not exceed the following limits during the commissioning period. These emission limits shall include emissions resulting from the start-up and shutdown of the Gas Turbines (S-55 & S-57).

NO <sub>x</sub> (as NO <sub>2</sub> )	8,428 pounds per calendar day	400 pounds per hour
CO	12,982 pounds per calendar day	584 pounds per hour
POC (as CH <sub>4</sub> )	668 pounds per calendar day	
PM <sub>10</sub>	624 pounds per calendar day	
SO <sub>2</sub>	148.2 pounds per calendar day	

**Verification:** The owner/operator shall submit a monthly compliance report to the CPM. In this report the owner/operator shall provide the accrued emissions and shall indicate how this condition is being implemented.

**AQ-12.** Prior to the end of the Commissioning Period, the Owner/Operator shall conduct a District and CEC approved source test using external continuous emission monitors to determine compliance with condition 21. The source test shall determine NO<sub>x</sub>, CO, and POC emissions during start-up and shutdown of the gas turbines. The POC emissions shall be analyzed for methane and ethane to account for the presence of unburned natural gas. The

source test shall include a minimum of three start-up and three shutdown periods. No later than twenty working days before the execution of the source tests, the Owner/Operator shall submit to the District and the CEC Compliance Program Manager (CPM) a detailed source test plan designed to satisfy the requirements of this condition. The District and the CEC CPM will notify the Owner/Operator of any necessary modifications to the plan within 20 working days of receipt of the plan; otherwise, the plan shall be deemed approved. The Owner/Operator shall incorporate the District and CEC CPM comments into the test plan. The Owner/Operator shall notify the District and the CEC CPM within seven (7) working days prior to the planned source testing date. Source test results shall be submitted to the District and the CEC CPM within 30 days of the source testing date.

**Verification:** No later than thirty five working days before the commencement of the source tests, the Owner/Operator shall submit to the District and the CPM a detailed source test plan designed to satisfy the requirements of this condition. The District and the CPM will notify the Owner/Operator of any necessary modifications to the plan within 20 working days of receipt of the plan; otherwise, the plan shall be deemed approved. The Owner/Operator shall incorporate the District and CPM comments into the test plan. The Owner/Operator shall notify the District and the CPM within seven (7) working days prior to the planned source testing date. Source test results shall be submitted to the District and the CPM within 30 days of the source testing date.

**Conditions for the Gas Turbines (S-55 & S-57) and the Heat Recovery Steam Generators (HRSGs; S-56 & S-58)**

**AQ-13.** The Gas Turbines (S-55 and S-57) and HRSG Duct Burners (S-56 and S-58) shall be fired exclusively on natural gas. (BACT for SO<sub>2</sub> and PM<sub>10</sub>)

**Verification:** The project owner shall maintain, on a monthly basis, a laboratory analysis showing the sulfur content of natural gas being burned at the facility. The monthly sulfur analysis shall be incorporated into the quarterly compliance reports.

**AQ-14.** The combined heat input rate to each power train consisting of a Gas Turbine and its associated HRSG (S-55 & S-56 and S-57 & S-58) shall not exceed 2,249.1 MM Btu per hour, averaged over any rolling 3-hour period. (PSD for NO<sub>x</sub>)

**Verification:** As part of the quarterly and annual compliance reports, the owner/operator shall include information on the date, time, and duration of any violation of this permit condition.

**AQ-15.** The combined heat input rate to each power train consisting of a Gas Turbine and its associated HRSG (S-55 & S-56 and S-57 & S-58) shall not exceed 53,978.4 MM Btu per calendar day. (PSD for PM<sub>10</sub>)

**Verification:** As part of the quarterly and annual compliance reports, the owner/operator shall include information on the date, time, and duration of any violation of this permit condition.

**AQ-16.** The combined cumulative heat input rate for the Gas Turbines (S-55 & S-57) and the HRSGs (S-56 & S-58) shall not exceed 37,960,000 MM Btu per year. (Offsets)

**Verification:** As part of the quarterly and annual compliance reports, the owner/operator shall include information on the date, time, and duration of any violation of this permit condition.

**AQ-17.** The HRSG duct burners (S-56 and S-58) shall not be fired unless its associated Gas Turbine (S-55 and S-57, respectively) is in operation. (BACT for NO<sub>x</sub>)

**Verification:** As part of the quarterly and annual compliance reports, the owner/operator shall include information on the date, time, and duration of any violation of this permit condition.

**AQ-18.** Except as provided in Condition No. 8, S-55 Gas Turbine and S-56 HRSG shall be abated by the properly operated and properly maintained A-55 Selective Catalytic Reduction (SCR) System whenever fuel is combusted at those sources and the A-55 catalyst bed has reached minimum operating temperature. (BACT for NO<sub>x</sub>)

**Verification:** As part of the quarterly and annual compliance reports, the owner/operator shall provide information on any major problem in the operation of the Oxidizing Catalyst and Selective Catalytic Reduction Systems for the Gas Turbines and HRSGs. The information shall include, at a minimum, the date and description of the problem and the steps taken to resolve the problem.

**AQ-19.** Except as provided in Condition No. 9, S-57 Gas Turbine and S-58 HRSG shall be abated by the properly operated and properly maintained A-57 Selective Catalytic Reduction (SCR) System whenever fuel is combusted at those sources and the A-57 catalyst bed has reached minimum operating temperature. (BACT for NO<sub>x</sub>)

**Verification:** As part of the quarterly and annual compliance reports, the owner/operator shall provide information on any major problem in the operation of the Oxidizing Catalyst and Selective Catalytic Reduction Systems for the Gas Turbines and HRSGs. The information shall include, at a minimum, the date and description of the problem and the steps taken to resolve the problem.

**AQ-20.** The Gas Turbines (S-55 & S-57) and HRSGs (S-56 & S-58) shall comply with requirements (a) through (h) under all operating scenarios, including duct burner firing mode and steam injection power augmentation mode. Requirements (a) through (h) do not apply during a gas turbine start-up or shutdown. (BACT, PSD, and Toxic Risk Management Policy)

- (a) Nitrogen oxide mass emissions (calculated in accordance with District approved methods as NO<sub>2</sub>) at P-55 (the combined exhaust point for the S-55 Gas Turbine and the S-56 HRSG after abatement by A-55 SCR System) shall not exceed 20.2 pounds per hour or 0.0090 lb./MM Btu (HHV) of natural gas fired. Nitrogen oxide mass emissions (calculated in accordance with District approved methods as NO<sub>2</sub>) at P-57 (the combined exhaust point for the S-57 Gas Turbine and the S-58 HRSG after abatement by A-57 SCR System) shall not exceed 20 pounds per hour or 0.0090 lb./MM Btu (HHV) of natural gas fired. (PSD for NO<sub>x</sub>)
- (b) The nitrogen oxide emission concentration at emission points P-55 and P-57 each shall not exceed 2.5 ppmv, on a dry basis, corrected to 15% O<sub>2</sub>, averaged over any 1-hour period. (BACT for NO<sub>x</sub>)
- (c) Carbon monoxide mass emissions at P-55 and P-57 each shall not exceed 0.013 lb./MM Btu (HHV) of natural gas fired or 29.22 pounds per hour, averaged over any rolling 3-hour period. (PSD for CO)

- (d) The carbon monoxide emission concentration at P-55 and P-57 each shall not exceed 6 ppmv, on a dry basis, corrected to 15% O<sub>2</sub>, averaged over any rolling 3-hour period. (BACT for CO)
- (e) Ammonia (NH<sub>3</sub>) emission concentrations at P-55 and P-57 each shall not exceed 5 ppmv, on a dry basis, corrected to 15% O<sub>2</sub>, averaged over any rolling 3-hour period. This ammonia emission concentration shall be verified by the continuous recording of the ammonia injection rate to A-55 and A-57 SCR Systems. The correlation between the gas turbine and HRSG heat input rates, A-55 and A-57 SCR System ammonia injection rates, and corresponding ammonia emission concentration at emission points P-55 and P-57 shall be determined in accordance with permit condition #29. (TRMP for NH<sub>3</sub>)
- (f) Precursor organic compound (POC) mass emissions (as CH<sub>4</sub>) at P-55 and P-57 each shall not exceed 5.6 pounds per hour or 0.0025 lb./MM Btu of natural gas fired. (BACT)
- (g) Sulfur dioxide (SO<sub>2</sub>) mass emissions at P-55 and P-57 each shall not exceed 2.72 pounds per hour or 0.0007 lb./MM Btu of natural gas fired. (BACT)
- (h) Particulate matter (PM<sub>10</sub>) mass emissions at P-55 and P-57 each shall not exceed 11 pounds per hour or 0.00592 lb./MM Btu of natural gas fired when the HRSG duct burners are not in operation. Particulate matter (PM<sub>10</sub>) mass emissions at P-55 and P-57 each shall not exceed 13 pounds per hour or 0.00574 lb./MM Btu of natural gas fired when the HRSG duct burners are in operation. (BACT)

**Verification:** The project owner shall submit to the District and CPM, quarterly reports for the preceding calendar quarter by January 30, April 30, July 30, and October 30, and an annual compliance report by January 30 for the preceding year. The quarterly and annual compliance reports shall contain the following information.

- (a) Operating parameters of emission control equipment, including but not limited to ammonia injection rate, NO<sub>x</sub> emission rate and ammonia slip.
- (b) Total plant operation time (hours), number of startups, hours in cold startup, hours in warm startup, hours in hot startup, and hours in shutdown.
- (c) Date and time of the beginning and end of each startup and shutdown period.
- (d) Average plant operation schedule (hours per day, days per week, weeks per year).
- (e) All continuous emissions data reduced and reported in accordance with the District approved CEMS protocol.
- (f) Maximum hourly, maximum daily, total quarterly, and total calendar year emissions of NO<sub>x</sub>, CO, PM<sub>10</sub>, VOC and SO<sub>x</sub> (including calculation protocol).
- (g) Fuel sulfur content (monthly laboratory analyses, monthly natural gas sulfur content reports from the natural gas supplier(s), or the results of a custom fuel monitoring schedule approved by the District.
- (h) A log of all excess emissions, including the information regarding malfunctions/breakdowns.
- (i) Any permanent changes made in the plant process or production, which would affect air pollutant emissions, and indicate when changes were made.
- (j) Any maintenance to any air pollutant control system (recorded on an as-performed basis).

In addition, this information shall be maintained on site for a minimum of five (5) years and shall be provided to District personnel on request.



**AQ-21.** The regulated air pollutant mass emission rates from each of the Gas Turbines (S-55 and S-57) during a start-up or a shutdown shall not exceed the limits established below.  
(PSD)

Cold Start-Up (lb./start-up)	Hot Start-Up (lb./start-up)	Shutdown (lb./shutdown)
Oxides of Nitrogen (as NO <sub>2</sub> )	452	189
Carbon Monoxide (CO)	990	291
Precursor Organic Compounds (as CH <sub>4</sub> )	112	27
		6

In the event that CEMs are not available or reliable, the following emission factors shall be used to estimate startup and shutdown emissions. These emission rates per unit (turbine/HRSG) are as follows:

	Cold Startup	Hot Startup	Shutdown
NO <sub>x</sub> (as NO <sub>2</sub> ) lb/hr	170	164	59
CO lb/hr	548	268	73
POC lb/hr	26.3	17.9	6
PM-10 lb/hr	11	11	11
SO <sub>2</sub> lb/hr	1.62	1.62	1.62

**Verification:** The project owner shall submit to the District and CPM the quarterly and annual compliance reports as required by Condition AQ-20.

**AQ-22.** The Gas Turbines (S-55 and S-57) shall not be in start-up mode simultaneously.  
(PSD)

**Verification:** The project owner shall submit to the District and CPM the quarterly and annual compliance reports as required by Condition AQ-20.

**AQ-23.** Total combined emissions from the Gas Turbines and HRSGs (S-55, S-56, S-57, and S-58), including emissions generated during Gas Turbine start-ups and shutdowns shall not exceed the following limits during any calendar day:

- (a) 2,002 pounds of NO<sub>x</sub> (as NO<sub>2</sub>) per day (CEQA)
- (b) 3,604 pounds of CO per day (PSD)
- (c) 478 pounds of POC (as CH<sub>4</sub>) per day (CEQA)
- (d) 624 pounds of PM<sub>10</sub> per day (PSD)
- (e) 148.2 pounds of SO<sub>2</sub> per day (BACT)

**Verification:** The project owner shall submit to the District and CPM the quarterly and annual compliance reports as required by Condition AQ-20.

**AQ-24.** Cumulative combined emissions from the Gas Turbines and HRSGs (S-55, S-56, S-57, and S-58), including emissions generated during gas turbine start-ups and shutdowns shall not exceed the following limits during any consecutive twelve-month period:

- (a) 178.4 tons of NO<sub>x</sub> (as NO<sub>2</sub>) per year (Offsets, PSD)
- (b) 265.1 tons of CO per year (Cumulative Increase)
- (c) 49.1 tons of POC (as CH<sub>4</sub>) per year (Offsets)
- (d) 110.5 tons of PM<sub>10</sub> per year (Offsets, PSD)

(e) 26.0 tons of SO<sub>2</sub> per year

(Cumulative Increase)

**Verification:** The project owner shall submit to the District and CPM the quarterly and annual compliance reports as required by Condition AQ-20.

**AQ-25.** a. The maximum projected annual toxic air contaminant emissions (per condition 28) from the Gas Turbines and HRSGs combined (S-55, S-56, S-57, and S-58) shall not exceed the following limits:  
4,208 pounds of formaldehyde per year  
520 pounds of benzene per year  
41 pounds of Specified polycyclic aromatic hydrocarbons (PAHs) per year  
unless the following requirement is satisfied:

The owner/operator shall perform a health risk assessment using the emission rates determined by source test and the most current Bay Area Air Quality Management District approved procedures and unit risk factors in effect at the time of the analysis. This risk analysis shall be submitted to the District and the CEC CPM within 60 days of the source test date. The owner/operator may request that the District and the CEC CPM revise the carcinogenic compound emission limits specified above. If the owner/operator demonstrates to the satisfaction of the APCO that these revised emission limits will result in a cancer risk of not more than 1.0 in one million, the District and the CEC CPM may, at their discretion, adjust the carcinogenic compound emission limits listed above. (TRMP)

b. The maximum projected annual Hazardous Air Pollutant (HAP) emissions from the Gas Turbines and HRSGs combined (S-55, S-56, S-57, and S-58) shall not exceed the following limit:

20,000 pounds of hexane per year  
(US-CAA, Section 112(g))

Conformance with this limit shall be verified by the source testing in condition 32.

**Verification:** Compliance with condition AQ-32 shall be deemed as compliance with this condition. In addition, approval by the District and the CPM of the reports prepared for condition AQ-32 will constitute a verification of compliance with this condition.

**AQ-26.** The owner/operator shall demonstrate compliance with conditions 14 through 17, 20(a) through 20(d), 21, 23(a), 23(b), 24(a), and 24(b) by using properly operated and maintained continuous monitors (during all hours of operation including equipment Start-up and Shutdown periods) for all of the following parameters:

- (a) Firing Hours and Fuel Flow Rates for each of the following sources: S-55 & S-56 combined and S-57 & S-58 combined.
- (b) Carbon Dioxide (CO<sub>2</sub>) or Oxygen (O<sub>2</sub>) concentrations, Nitrogen Oxides (NO<sub>x</sub>) concentrations, and Carbon Monoxide (CO) concentrations at each of the following exhaust points: P-55 and P-57.
- (c) Ammonia injection rate at A-55 and A-57 SCR Systems
- (d) Steam injection rate at S-55 & S-57 Gas Turbine Combustors

The owner/operator shall record all of the above parameters every 15 minutes (excluding normal calibration periods) and shall summarize all of the above parameters for each clock hour. For each

calendar day, the owner/operator shall calculate and record the total firing hours, the average hourly fuel flow rates, and average hourly pollutant emission concentrations.

The owner/operator shall use the parameters measured above and District-approved calculation methods to calculate the following parameters:

- (e) Heat Input Rate for each of the following sources: S-55 & S-56 combined and S-57 & S-58 combined.
- (f) Corrected NO<sub>x</sub> concentrations, NO<sub>x</sub> mass emissions (as NO<sub>2</sub>), corrected CO concentrations, and CO mass emissions at each of the following exhaust points: P-55 and P-57.

Applicable to emission points P-55 and P-57, the owner/operator shall record the parameters specified in conditions 26(e) and 26(f) at least once every 15 minutes (excluding normal calibration periods). As specified below, the owner/operator shall calculate and record the following data:

- (g) total Heat Input Rate for every clock hour and the average hourly Heat Input Rate for every rolling 3-hour period.
- (h) on an hourly basis, the cumulative total Heat Input Rate for each calendar day for the following: each Gas Turbine and associated HRSG combined and all four sources (S-55, S-56, S-57, and S-58) combined.
- (i) the average NO<sub>x</sub> mass emissions (as NO<sub>2</sub>), CO mass emissions, and corrected NO<sub>x</sub> and CO emission concentrations for every clock hour and for every rolling 3-hour period.
- (j) on an hourly basis, the cumulative total NO<sub>x</sub> mass emissions (as NO<sub>2</sub>) and the cumulative total CO mass emissions, for each calendar day for the following: each Gas Turbine and associated HRSG combined, and all four sources (S-55, S-56, S-57, and S-58) combined.
- (k) For each calendar day, the average hourly Heat Input Rates, Corrected NO<sub>x</sub> emission concentrations, NO<sub>x</sub> mass emissions (as NO<sub>2</sub>), corrected CO emission concentrations, and CO mass emissions for each Gas Turbine and associated HRSG combined.
- (l) on a daily basis, the cumulative total NO<sub>x</sub> mass emissions (as NO<sub>2</sub>) and cumulative total CO mass emissions, for the previous consecutive twelve month period for all four sources (S-55, S-56, S-57, and S-58) combined.

(1-520.1, 9-9-501, BACT, Offsets, NSPS, PSD, Cumulative Increase)

**Verification:** At least 30 days before the initial operation, the owner/operator shall submit to the CPM a plan on how the measurements and recordings required by this condition will be performed.

**AQ-27.** To demonstrate compliance with conditions 20(f), 20(g), 20(h), 23(c) through 23(e), and 24(c) through 24(e), the owner/operator shall calculate and record on a daily basis, the Precursor Organic Compound (POC) mass emissions, Fine Particulate Matter (PM<sub>10</sub>) mass emissions (including condensable particulate matter), and Sulfur Dioxide (SO<sub>2</sub>) mass emissions from each power train. The owner/operator shall use the actual Heat Input Rates calculated pursuant to condition 26, actual Gas Turbine Start-up Times, actual Gas Turbine Shutdown Times, and CEC and District-approved emission factors to calculate these emissions. The calculated emissions shall be presented as follows:

- (a) For each calendar day, POC, PM<sub>10</sub>, and SO<sub>2</sub> emissions shall be summarized for: each power train (Gas Turbine and its respective HRSG combined) and all four sources (S-55, S-56, S-57, and S-58) combined.

- (b) on a daily basis, the 365 day rolling average cumulative total POC, PM<sub>10</sub>, and SO<sub>2</sub> mass emissions, for all four sources (S-55, S-56, S-57, and S-58) combined.

(Offsets, PSD, Cumulative Increase)

**Verification:** The project owner shall submit to the District and CPM the quarterly and annual compliance reports as required by Condition AQ-20.

**AQ-28.** To demonstrate compliance with Condition 25, the owner/operator shall calculate and record on an annual basis the maximum projected annual emissions of: Formaldehyde, Benzene, Specified PAHs and hexane. Maximum projected annual emissions shall be calculated using the maximum Heat Input Rate of 37,960,000 MM Btu/year and the highest emission factor (pounds of pollutant per MM Btu of Heat Input) determined by any source test of the S-55 & S-57 Gas Turbines and/or S-56 & S-58 Heat Recovery Steam Generators. If this calculation method results in an unrealistic mass emission rate (the highest emission factor occurs at a low firing rate) the applicant may use an alternate calculation, subject to District approval. (TRMP)

**Verification:** The project owner shall submit to the District and CPM the quarterly and annual compliance reports as required by Condition AQ-20.

**AQ-29.** Within 60 days of start-up of the Potrero PP Unit #7, the owner/operator shall conduct a District-approved source test on exhaust point P-55 or P-57 to determine the corrected ammonia (NH<sub>3</sub>) emission concentration to determine compliance with condition 20(e). The source test shall determine the correlation between the heat input rates of the gas turbine and associated HRSG, A-55 or A-57 SCR System ammonia injection rate, and the corresponding NH<sub>3</sub> emission concentration at emission point P-55 or P-57. The source test shall be conducted over the expected operating range of the turbine and HRSG (including, but not limited to minimum, 70%, 85%, and 100% load) to establish the range of ammonia injection rates necessary to achieve NO<sub>x</sub> emission reductions while maintaining ammonia slip levels. Continuing compliance with condition 20(e) shall be demonstrated through calculations of corrected ammonia concentrations based upon the source test correlation and continuous records of ammonia injection rate. (TRMP)

**Verification:** Approval of the source test protocols, as required in condition AQ-31, and the source test reports shall be deemed as verification for this condition. The owner/operator shall notify the District and the CPM within seven (7) working days before the execution of the source tests required in this condition. Source test results shall be submitted to the District and to the CPM within 60 days of the date of the tests.

**AQ-30.** Within 60 days of start-up of the Potrero PP Unit #7 and on an annual basis thereafter, the owner/operator shall conduct a District-approved source test on exhaust points P-55 and P-57 while each Gas Turbine and associated Heat Recovery Steam Generator are operating at maximum load (including steam injection power augmentation mode) to determine compliance with Conditions 20(a), (b), (c), (d), (f), (g), and (h), while each Gas Turbine and associated Heat Recovery Steam Generator are operating at minimum load to determine compliance with Conditions 20(c) and (d), and to verify the accuracy of the continuous emission monitors required in condition 26. The owner/operator shall test for (as a minimum): water content, stack gas flow rate, oxygen concentration, precursor organic compound concentration and mass emissions, nitrogen oxide concentration and mass emissions (as NO<sub>2</sub>), carbon monoxide concentration and mass emissions, sulfur dioxide

concentration and mass emissions, methane, ethane, and particulate matter (PM<sub>10</sub>) emissions including condensable particulate matter. (BACT, offsets)

**Verification:** Approval of the source test protocols, as required in condition AQ-31, and the source test reports shall be deemed as verification for this condition. The owner/operator shall notify the District and the CPM within seven (7) working days before the execution of the source tests required in this condition. Source test results shall be submitted to the District and to the CPM within 60 days of the date of the tests.

**AQ-31.** The owner/operator shall obtain approval for all source test procedures from the District's Source Test Section and the CEC CPM prior to conducting any tests. The owner/operator shall comply with all applicable testing requirements for continuous emission monitors as specified in Volume V of the District's Manual of Procedures. The owner/operator shall notify the District's Source Test Section and the CEC CPM in writing of the source test protocols and projected test dates at least 7 days prior to the testing date(s). As indicated above, the Owner/Operator shall measure the contribution of condensable PM (back half) to the total PM<sub>10</sub> emissions. However, the Owner/Operator may propose alternative measuring techniques to measure condensable PM such as the use of a dilution tunnel or other appropriate method used to capture semi-volatile organic compounds. Source test results shall be submitted to the District and the CEC CPM within 60 days of conducting the tests. (BACT)

**Verification:** Submitting and getting approval of the source test procedures is the verification of this condition. The owner/operator shall notify the District and the CPM within seven (7) working days before the execution of the source tests required in this condition. Source test results shall be submitted to the District and to the CPM within 60 days of the date of the tests.

**AQ-32.** Within 60 days of start-up of the Potrero PP Unit #7 and on an biennial basis (once every two years) thereafter, the owner/operator shall conduct a District-approved source test on exhaust point P-55 or P-57 while the Gas Turbine and associated Heat Recovery Steam Generator are operating at maximum allowable operating rates to demonstrate compliance with Condition 25. If three consecutive biennial source tests demonstrate that the annual emission rates calculated pursuant to condition 28 for any of the compounds listed below are less than the BAAQMD Toxic Risk Management Policy trigger levels shown, then the owner/operator may discontinue future testing for that pollutant:

Benzene	≤	26.8 pounds/year
Formaldehyde	≤	132 pounds/year
Specified PAHs	≤	0.18 pounds/year
Hexane		≤20,000 pounds/year

(TRMP)

**Verification:** The owner/operator shall notify the District and the CPM within seven (7) working days before the execution of the source tests required in this condition. Source test results shall be submitted to the District and to the CPM within 60 days of the date of the tests.

**AQ-33.** The owner/operator of the Potrero PP Unit #7 shall submit all reports (including, but not limited to monthly CEM reports, monitor breakdown reports, emission excess reports, equipment breakdown reports, etc.) as required by District Rules or Regulations and in

accordance with all procedures and time limits specified in the Rule, Regulation, Manual of Procedures, or Enforcement Division Policies & Procedures Manual. (Regulation 2-6-502)

**Verification:** The project owner shall submit to the District and CPM the quarterly and annual compliance reports as required by Condition AQ-20.

**AQ-34.** The owner/operator of the Potrero PP Unit #7 shall maintain all records and reports on site for a minimum of 5 years. These records shall include but are not limited to: continuous monitoring records (firing hours, fuel flows, emission rates, monitor excesses, breakdowns, etc.), source test and analytical records, natural gas sulfur content analysis results, emission calculation records, records of plant upsets and related incidents. The owner/operator shall make all records and reports available to District and the CEC CPM staff upon request. (Regulation 2-6-501)

**Verification:** During site inspection, the owner/operator shall make all records and reports available to the District, ARB, EPA or CEC staff.

**AQ-35.** The owner/operator of the Potrero PP Unit #7 shall notify the District and the CEC CPM of any violations of these permit conditions. Notification shall be submitted in a timely manner, in accordance with all applicable District Rules, Regulations, and the Manual of Procedures. Notwithstanding the notification and reporting requirements given in any District Rule, Regulation, or the Manual of Procedures, the owner/operator shall submit written notification (facsimile is acceptable) to the Enforcement Division within 96 hours of the violation of any permit condition. (Regulation 2-1-403)

**Verification:** Submittal of these notifications as required by this condition is the verification of these permit conditions. In addition, as part of the quarterly and annual compliance reports of Condition AQ-20, the owner/operator shall include information on the dates when these violations occurred and when the owner/operator notified the District and the CPM.

**AQ-36.** The stack height of emission points P-55 and P-57 shall each be at least 180 feet above grade level at the stack base. (PSD, TRMP)

**Verification:** 120 days prior to start any site clearing or ground disturbance activities, the project owner/operator shall provide the District and CPM an "approved for construction" drawing showing the appropriate stack height and location of sampling ports and platforms. The project owner/operator shall make the site available to the District, EPA and CEC staff for inspection.

**AQ-37.** The Owner/Operator of Potrero PP Unit #7 shall provide adequate stack sampling ports and platforms to enable the performance of source testing. The location and configuration of the stack sampling ports shall be subject to BAAQMD review and approval. (Regulation 1-501)

**Verification:** 120 days prior to start any site clearing or ground disturbance activities, the project owner/operator shall provide the District and CPM an "approved for construction" drawing showing the appropriate stack height and location of sampling ports and platforms. The project owner/operator shall make the site available to the District, EPA and CEC staff for inspection.

**AQ-38.** Within 180 days of the issuance of the Authority to Construct for the Potrero PP Unit #7, the Owner/Operator shall contact the BAAQMD Technical Services Division regarding requirements for the continuous monitors, sampling ports, platforms, and source

tests required by conditions 26, 29, 30 and 32. All source testing and monitoring shall be conducted in accordance with the BAAQMD Manual of Procedures. (Regulation 1-501)

**Verification:** The project owner shall notify the CPM within 7 days of receiving the District's approval for the source testing and monitoring plan.

**AQ-39.** Prior to the issuance of the BAAQMD Authority to Construct for the Potrero PP Unit #7, the Owner/Operator shall provide to the District valid emission reduction credit banking certificates in the amount of 205.2 tons/year of Nitrogen Oxides, 56.5 tons/year of Precursor Organic Compounds or equivalent (as defined by District Regulations 2-2-302.1 and 2-2-302.2), and 110.5 tons of Particulate Matter less than 10 microns or equivalent (as defined by District Regulations 2-2-303.1). (Offsets)

**Verification:** At least thirty (30) days prior to issuance of the District's Authority to Construct, the project owner shall provide valid emission reduction credit banking certificates to the District and the CPM for approval.

**AQ-40.** Prior to the start of construction of the Potrero PP Unit #7, the Owner/Operator shall provide to the District valid emission reduction credit banking certificates in the amount of 205.2 tons/year of Nitrogen Oxides, 56.5 tons/year of Precursor Organic Compounds or equivalent as defined by District Regulations 2-2-302.1 and 2-2-302.2 and 110.5 tons of Particulate Matter less than 10 microns. (Offsets)

**Verification:** At least thirty (30) days prior to issuance of the District's Authority to Construct, the project owner shall provide valid emission reduction credit banking certificates to the District and the CPM for approval.

**AQ-41.** Pursuant to BAAQMD Regulation 2, Rule 6, section 404.1, the owner/operator of the Potrero PP Unit #7 shall submit an application to the BAAQMD for a major facility review permit within 12 months of the issuance of the PSD Permit. (Regulation 2-6-404.1)

**Verification:** The owner/operator shall submit to the CPM copies of the Federal (Title IV) Acid Rain and (Title V) Operating Permit within 30 days after they are issued by the District.

**AQ-42.** Pursuant to 40 CFR Part 72.30(b)(2)(ii) of the Federal Acid Rain Program, the owner/operator of the Potrero PP Unit #7 shall not operate either of the gas turbines until either: 1) a Title IV Operating Permit has been issued; 2) 24 months after a Title IV Operating Permit Application has been submitted, whichever is earlier. (Regulation 2, Rule 7)

**Verification:** The owner/operator shall submit to the CPM copies of the Federal (Title IV) Acid Rain and (Title V) Operating Permit within 30 days after they are issued by the District.

**AQ-43.** The Potrero PP Unit #7 shall comply with the continuous emission monitoring requirements of 40 CFR Part 75. (Regulation 2, Rule 7)

**Verification:** At least 45 days prior to any site clearing or ground disturbance activities, the project owner/operator shall seek approval from the District for an emission monitoring plan.

**AQ-44.** The owner/operator shall take monthly samples of the natural gas combusted at the Potrero PP Unit #7. The samples shall be analyzed for sulfur content using District-approved laboratory methods or the owner/operator shall obtain certified analytical results from the gas supplier. The sulfur content test results shall be retained on site for a minimum of five years from the test date and shall be utilized to satisfy the requirements of 40 CFR Part 60, subpart GG. If the results from six consecutive monthly samples show results below 0.5 grains per 100 scf, the owner/operator may discontinue the sampling program with District approval. (cumulative increase)

**Verification:** The project owner shall submit to the District and CPM the quarterly and annual compliance reports as required by Condition AQ-20.

## **REFERENCES**

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SECAL (Southern Energy California). 2000a. Application for Certification, Potrero Power Plant Unit 7 Project (00-AFC-4). Submitted to the California Energy Commission, May 31, 2000.

SECAL (Southern Energy California). 2000b. Supplemental Information in Response to CEC Data Adequacy Request, Application for Certification, Potrero Power Plant Unit 7 Project (00-AFC-4). Submitted to the California Energy Commission, August 31, 2000.

SECAL (Southern Energy California). 2001a. Amendment to the Application for Certification, Potrero Power Plant Unit 7 Project (00-AFC-4). Addresses the demolition of six existing structures. Submitted to the California Energy Commission, January 19, 2001.

SECAL (Southern Energy California). 2001b. Amendment to the Application for Certification, Potrero Power Plant Unit 7 Project (00-AFC-4). Addresses data responses to staff's Data Requests 30 – 32 (Cultural Resources), revises AFC Section 8.3, Cultural Resources, and AFC Appendix R, Cultural Resources. Submitted to the California Energy Commission, January 31, 2001.

BAAQMD (Bay Area Air Quality Management District), 2000. Bay Area 2000 Clean Air Plan. December 20, 2000.

## **DATA RESPONSES**

SECAL (Southern Energy California). SEP2000DRes1. Southern Energy California response to staff Data Requests, Set 1, Nos. 1 through 139, Potrero Power Plant Unit 7 Project (00-AFC-4). Submitted to California Energy Commission on December 7, 2000.

SECAL (Southern Energy California). SEP2000DRes2. Southern Energy California response to staff Data Requests, Set 2, Nos. 140 through 161, Potrero Power



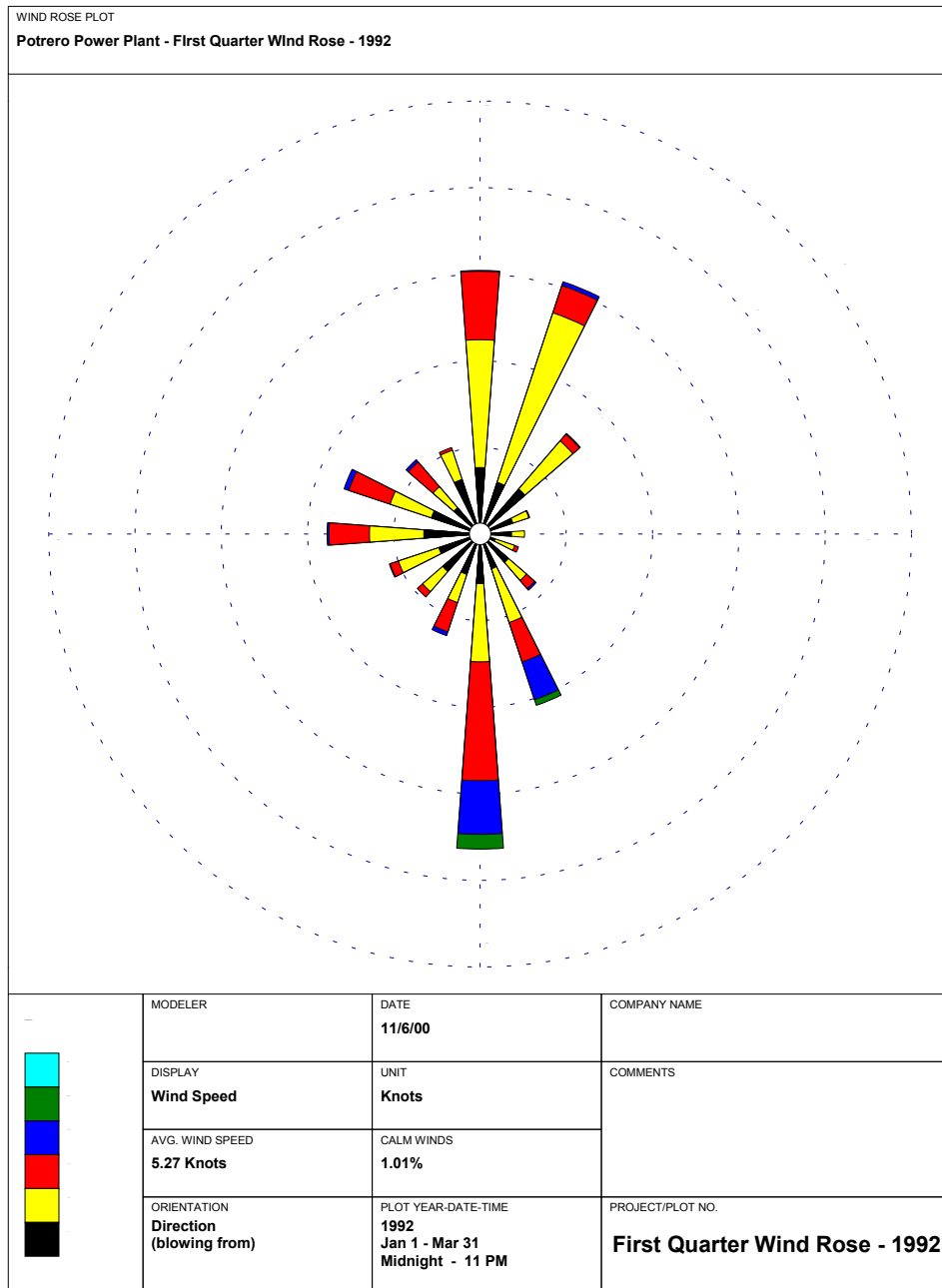
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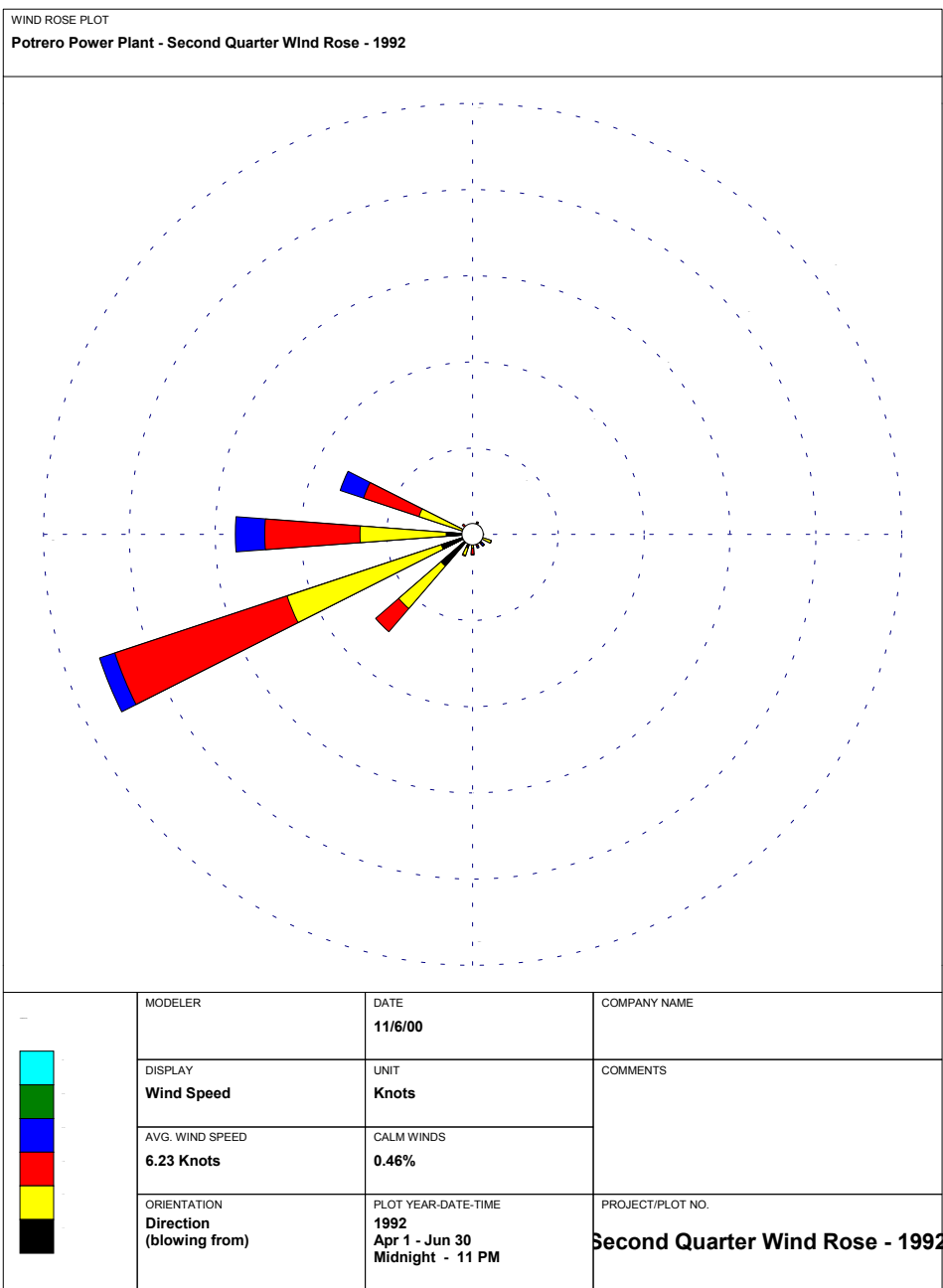
SECAL (Southern Energy California). SEP2001DRes3. Southern Energy California response to staff Data Requests, Set 3, Nos. 162 through 169, Potrero Power Plant Unit 7 Project (00-AFC-4). Submitted to California Energy Commission January 29, 2001.

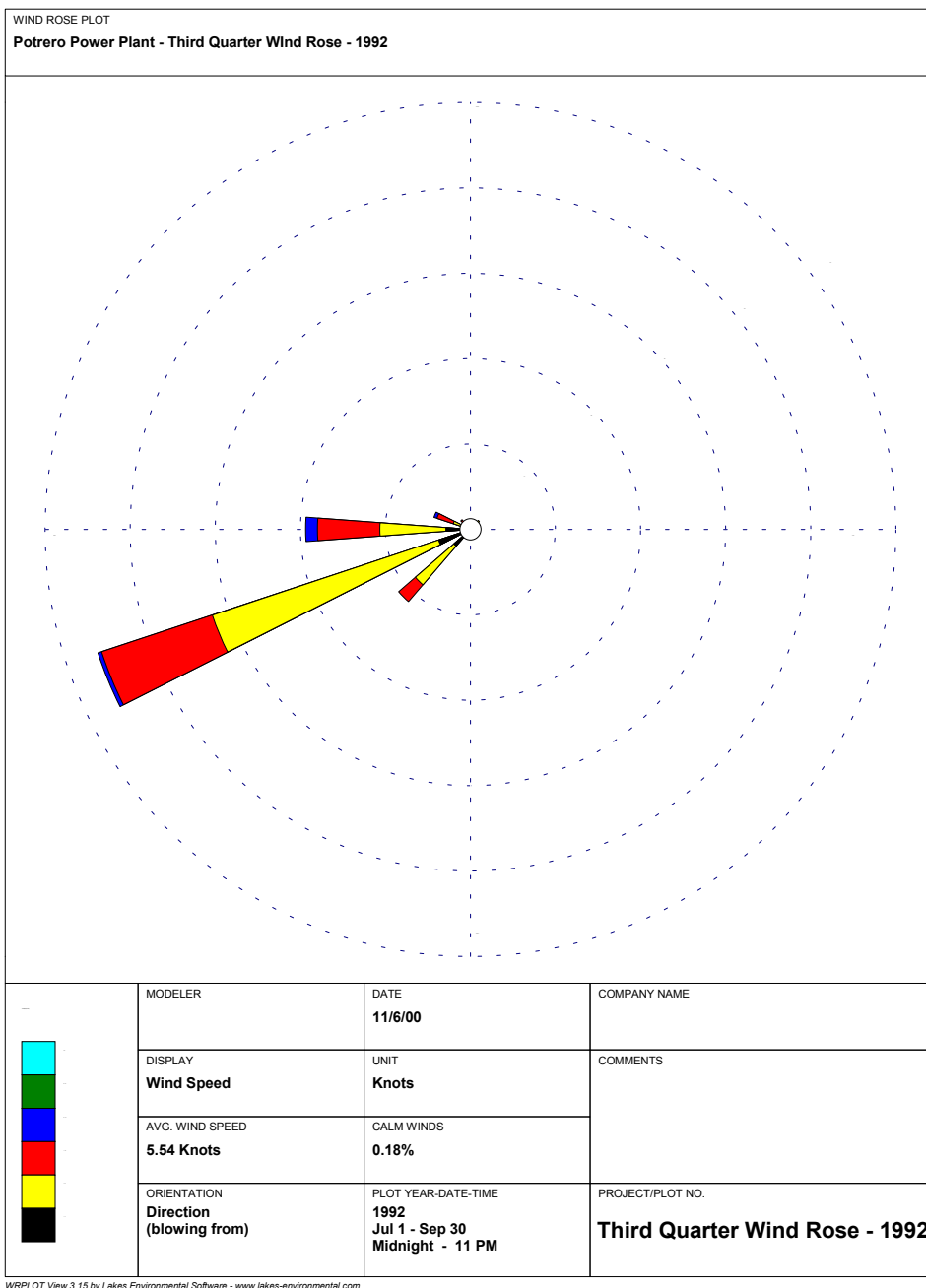
Mirant (Mirant Corporation). Mirant2001DResSAEJ. Mirant responses to Southeast Alliance for Environmental Justice, Data Requests, Set 1, Nos. 1 through 155, Potrero Power Plant Unit 7 Project (00-AFC-4). Submitted to California Energy Commission February 27, 2001.

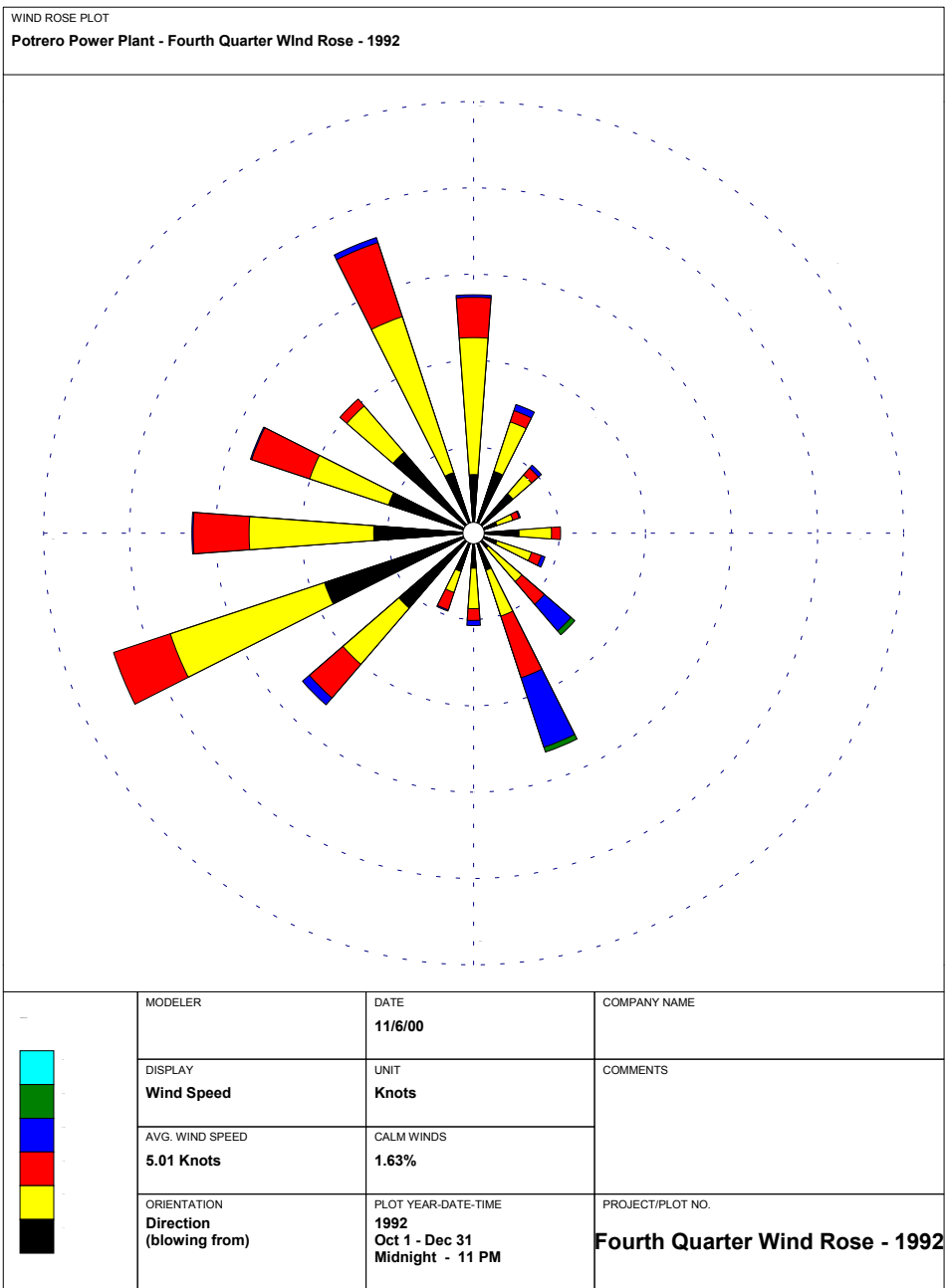
## APPENDIX A

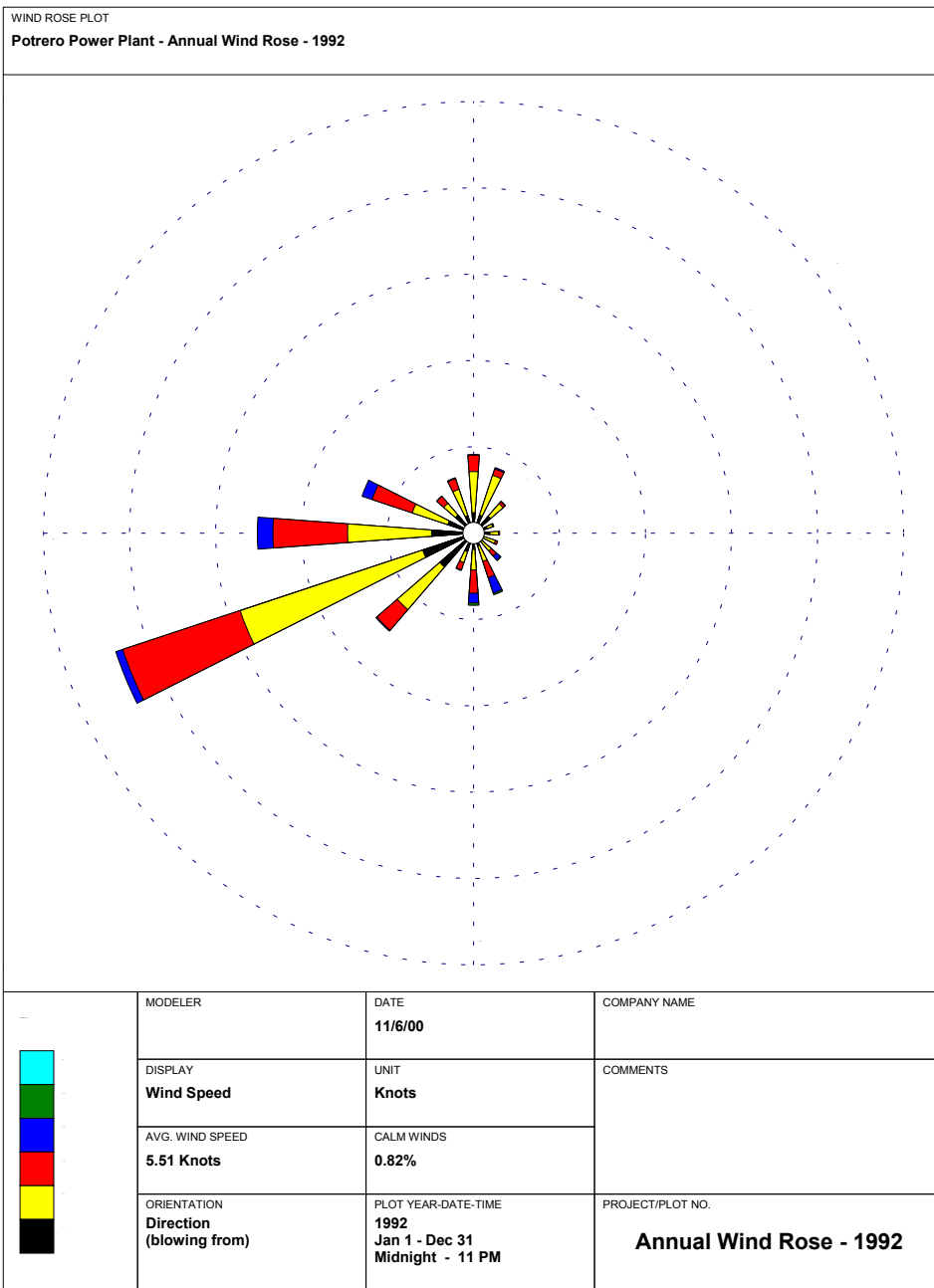
### WIND ROSE DATA











## **APPENDIX B**

### **PROPOSED LOWER EMISSIONS SCHOOL BUS RETROFITTING PROGRAM**

#### **The project**

Potrero Unit 7 is a proposed nominal 540 megawatt natural gas-fired, combined-cycle power plant comprised combustion turbines, one steam turbine, and supporting equipment. The project is expected to emit 110 tons per year of particulate matter (PM<sub>10</sub>), which could create significant adverse impacts. Staff is investigating all feasible means of reducing any impacts to a level of insignificance.

#### **The problem**

The area experiences numerous violations of the state PM<sub>10</sub> ambient air quality standards. From 1990 through 1999 the data show that PM<sub>10</sub> violations occurred primarily between the months of October through December when the weather is cold. The area PM<sub>10</sub> violations typically caused by wood smoke, combustion of fossil fuels, and airborne entrained dust from motor vehicles, and construction activities (Bay Area 2000 Clean Air Plan). In addition, the area experiences a lower levels of solar radiation, which leads to stronger temperature inversions that are conducive to the buildup of PM<sub>10</sub> near ground level, which in turn contributes to the violations of the PM<sub>10</sub> air quality standard.

To mitigate the project's PM<sub>10</sub> emission impacts, staff recommends that the applicant contribute one million dollar into the District proposed "Lower Emission School Bus Particulate Matter Retrofit Program" to help funding the reimbursement of retrofitting school buses with PM<sub>10</sub> control devices.

#### **How the program works:**

Basically, any interested public school that owns and operates 1977 or newer model school buses can apply to the BAAQMD for reimbursement the total cost for retrofitting those buses with PM<sub>10</sub> control devices. The control devices must be pre-certified by the Air Resources Board that they would reduce the PM<sub>10</sub> emissions by 85 percent.

The school districts must submit an application to the BAAQMD by August 15, 2001 for the funding of the retrofitting program. Once the grant is awarded, the school district can start order equipment and rearrange for installation. Once the installation is completed, the school district will provide the BAAQMD a proof of installation, after which the school district will be reimbursed. Currently, the BAAQMD has considered approval of \$2.3 million for the program, which shall be on a first come, first serve basis.

- Staff suggests that the applicant contribute one million dollars to the BAAQMD school bus retrofitting program.

#### **How staff arrived at the suggested fund contribution**

Criteria: To achieve a total of 27.5 tons of PM<sub>10</sub> emission reductions that could mitigate the project direct PM<sub>10</sub> emission contribution to the area for one calendar quarter.

### Known data

1. Current PM<sub>10</sub> emissions for diesel buses = 0.8 g/hp-hr (Control of Emissions of Air Pollution from Highway Heavy-Duty Engines)
2. Each bus engine would average about 275 hp (assumed by staff)
3. Each bus would run approximately 4 hrs/day and 270 days per year (assumed by staff)
4. Each control device will achieve 85 percent PM<sub>10</sub> reduction (BAAQMD Lower Emission School Bus Particulate Matter Retrofit Program)
5. Each device including installation would cost \$8,000

### Calculations:

- Current school bus PM<sub>10</sub> emissions:

$$\frac{0.8g}{hp-hr} * \frac{275hp}{bus} * \frac{lbm}{453.6g} * 4hr/d * \frac{270d}{yr} = 524 \frac{lbs}{bus}$$

- Emissions reduction after retrofit:

$$\dot{\Delta E} = 524lb / bus * (0.85) = \frac{445lbsPM_{10}}{bus}$$

- Numbers of unit needed:

$$27.5tons * \frac{2000lb}{ton} * \frac{bus}{445lbPM_{10}} = 125buses$$

- Cost @ \$8,000/bus

$$125buses * \$8,000 = \$1,000,000$$



## **APPENDIX C**

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### Project's PM<sub>10</sub> Cumulative Impact Isopleths

# **AQUATIC BIOLOGICAL RESOURCES**

Testimony of Noel Davis, Ph.D., Mike Foster, Ph.D. and Rick York

## **INTRODUCTION**

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This section of the Final Staff Analysis (FSA) provides staff's analysis of potential impacts to aquatic biological resources from the construction and operation of the Potrero Power Plant Unit 7 Project (Unit 7) proposed by Mirant California, LLC (Mirant). This analysis addresses potential impacts to state and federally listed species, species of special concern, and areas of critical biological concern. This document presents information regarding the affected biotic community and the potential environmental impacts associated with the construction and operation of the proposed project. Impacts to aquatic biological resources may be directly associated with structures or actions undertaken as part of the proposed project or indirectly as they may affect the physical environment, which in turn, negatively affects habitat conditions for sensitive species. Impacts to aquatic biological resources that are similar in nature to existing or foreseeable future projects in the area are addressed in the Cumulative Impacts section.

This analysis is based, in part, upon information provided in the Application for Certification (AFC) for the Potrero Power Plant Unit 7 Project (SECAL, 2000a, AFC Section 8.2 and Appendices G and H), Supplemental Information to the AFC (SECAL 2000b), reports on biological surveys offshore the Potrero Power Plant by the Applicant's consultants (MIRANT2001BioSamp1, MIRANT2001BioSamp2, MIRANT2001BioSamp3, MIRANT2001BioSamp4, MIRANT2001BioSamp5, MIRANT2001BioSamp6, MIRANT2001BioSamp7, MIRANT2001BioSamp8, MIRANT2001BioSamp9, MIRANT2001BioSamp10, MIRANT2001BioSamp 11, MIRANT2001BioSamp12), various responses to staff data requests, workshops, site visits and discussions with various agency representatives.

## **LAWS, ORDINANCES, REGULATIONS, AND STANDARDS (LORS)**

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### **FEDERAL**

#### **Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. 403)**

This law prohibits the unauthorized obstruction or alteration of any navigable water of the United States. This section provides that the construction of any structure in or over any navigable water of the United States, or the accomplishment of any other work affecting the course, location, condition, or physical capacity of such waters is unlawful unless the work has been recommended by the Chief of Engineers and authorized by the Secretary of the Army. The Secretary's approval authority has since been delegated to the Chief of Engineers.

### **Endangered Species Act of 1973 (16 U.S.C. 1531 et seq.)**

This act provides for protection of threatened and endangered plant and animal species, and their critical habitat. The administering agency is the U. S. Fish and Wildlife Service (USFWS) and the National Marine Fisheries Service (NMFS).

### **Migratory Bird Treaty Act (16 U.S.C. 703 et seq.)**

This act prohibits the take of migratory birds, including nests with viable eggs. The administering agency is the USFWS.

### **Clean Water Act (33 U.S.C. 404 et seq.)**

The act prohibits the discharge of dredged or fill material in to the waters of the United States without a permit. Nationwide permit (NWP) 7 is required to construct an outfall structure and the effluent is authorized under the National Pollution Discharge Elimination System program (Section 402). The administering agencies are the U.S. Army Corps of Engineers (USACE) and the Regional Water Quality Control Board (RWQCB).

### **Clean Water Act [33 U.S.C. 316(b)]**

Section 316(b) of the Clean Water Act requires that the location, design, construction, and capacity of cooling water intake structures reflect the best technology available for minimizing adverse environmental impact. On November 9, 2001, the United States Environmental Protection Agency (USEPA) signed a final rule that implements Section 316(b) for new facilities that use water withdrawn from rivers, streams, lakes, reservoirs, estuaries, oceans or other waters of the United States for cooling purposes. This rule was published on December 18, 2001 in the Federal Register (40 CFR Parts 9, 122, et al). The national requirements establish the best technology available, based on a two-track approach for minimizing adverse environmental impacts associated with these structures. Based on size, Track I establishes national intake capacity and velocity requirements as well as location- and capacity-based requirements to reduce intake flow below certain proportions of certain water bodies. It also requires the permit applicant to select and implement design and construction technologies under certain conditions to minimize impingement mortality and entrainment. Track II allows permit applicants to conduct site-specific studies to demonstrate that alternatives to the Track I requirements will reduce impingement mortality and entrainment for all life stages of fish and shellfish to a level of reduction comparable to the level the facility would achieve at the cooling water intake structure if it met the Track I requirements.

### **Long-term Management Strategy (LTMS) for the Placement of Dredged Material in the San Francisco Bay Region, Volume I. Policy EIS/Programmatic EIR**

The disposal of dredged material should comply with the policies, goals and measures set forth by the US EPA and US ACE in this document to avoid impacts to biological resources. The administering agencies are the USACE and the USEPA.

### **Marine Mammal Protection Act (16 U.S.C. 1361 et seq.)**

This act provides protection for marine mammals.

## **Magnuson-Stevens Fishery Management and Conservation Act, as amended (16 U.S.C. 1801 et seq.)**

The 1996 amendments to the Magnuson-Stevens Fishery Management and Conservation Act set forth a number of new mandates for the NMFS, regional fishery management councils, and other federal agencies to identify and protect important marine and anadromous fish habitat. The Councils, with assistance from the NMFS, are required to delineate “essential fish habitat” (EFH) for all managed species. The Act defines EFH as “... those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity.” Federal action agencies which fund, permit, or carry out activities that may adversely impact EFH are required to consult with the NMFS regarding the potential effects of their actions on EFH, and respond in writing to the fishery service’s recommendations. For the Pacific region, EFH has been identified for a total of 89 species covered by three fishery management plans (FMPs) under the auspices of the Pacific Fishery Management Council.

## **STATE**

### **California Endangered Species Act of 1984**

Fish and Game Code sections 2050 et seq. protects California’s rare, threatened, and endangered species. Designated species are protected by regulation (See Cal. Code Regs., Tit. 14, Sections 670.2 and 670.5).

### **Nest or Eggs – Take, Possess, or Destroy**

Fish and Game Code section 3503 protects California’s birds by making it unlawful to take, possess, or needlessly destroy the nest or eggs or any bird.

### **Birds of Prey or Eggs – Take, Possess, or Destroy**

Fish and Game Code section 3503.5 protects California’s birds of prey and their eggs by making it unlawful to take, possess, or destroy any birds of prey or to take, possess, or destroy the nest or eggs of any such bird.

### **Migratory Birds – Take or Possession**

Fish and Game Code section 3513 protects California’s migratory birds by making it unlawful to take or possess any migratory non-game bird as designated in the Migratory Bird Treaty Act or any part of such migratory non-game bird.

### **Fully Protected Species**

Fish and Game Code sections 3511, 4700, 5050, and 5515 prohibits take of animals that are classified as Fully Protected in California.

### **Significant Natural Areas**

Fish and Game Code section 1930 et seq. designates certain areas such as refuges, natural sloughs, riparian areas and vernal pools as significant wildlife habitat.

### **McAteer-Petris Act**

This act established the San Francisco Bay Plan for the protection of the Bay and its natural resources and the development of the Bay and shoreline to their highest potential with a minimum of Bay fill. Section 66605 identifies criteria that must be satisfied before the Bay Commission can approve fill in the Bay. One such criterion

states that Bay fill can be authorized only when no alternative upland location is available for such purposes. Section 66605(d) states that the nature, location, and extent of fill should be such that it will minimize harmful effects to the bay area, such as, the reduction or impairment of the volume surface area or circulation of water, water quality, fertility of marshes or fish or wildlife resources.

The McAteer-Petris Act established the San Francisco Bay Conservation and Development Commission (BCDC) as the agency responsible for maintaining and carrying out the provisions of the Act. The Act directs the BCDC to exercise its authority to issue or deny permit applications for placing or extracting materials, or changing the use of any land, water, or structure within the area of its jurisdiction, in conformity with the provisions and policies of both the McAteer-Petris Act and the San Francisco Bay Plan. The San Francisco Bay Plan establishes the following policies related to fish and wildlife:

### **Policy 1 of the San Francisco Bay Plan**

The benefits of fish and wildlife should be insured for present and future generations of Californians. Therefore, to the greatest extent feasible, the remaining marshes and mudflats around the Bay, the remaining water volume and surface area of the Bay, and the adequate fresh water inflow into the Bay should be maintained.

### **Policy 2 of the San Francisco Bay plan**

Specific habitats that are needed to prevent the extinction of any species, or to maintain or increase any species that would provide substantial public benefits, should be protected, whether in the Bay or on the shoreline behind dikes.

## **LOCAL**

### **City and County of San Francisco Master Plan, Environmental Protection Element**

The City and County of San Francisco have established an objective to maintain and improve the quality of the Bay, ocean and shoreline areas. The City and County of San Francisco Master Plan, Environmental Protection Element recognizes that protecting and enhancing the many values of these resources requires ending pollution of the Bay and Ocean, closely controlling commercial uses of the water and shorelines, preserving and adding to the recreational frontage along the water, and protecting and improving the existing recreational frontage.

#### **Objective 3 Policy 1**

Cooperate with and otherwise support regulatory programs of existing regional, State and Federal agencies dealing with the Bay, Ocean, and Shorelines.

#### **Objective 3 Policy 2**

Promote the use and development of shoreline areas consistent with the Comprehensive Plan and best interest of San Francisco.

### **Objective 3 Policy 3**

Implement plans to improve sewage treatment and halt pollution of the Bay and ocean.

### **Objective 3 Policy 4**

Encourage and assist privately operated programs to conserve the resources of the Bay, Ocean, and Shorelines.

## **Sustainability Plan for the City and County of San Francisco**

This advisory document was adopted by the City and County of San Francisco in 1997 and provides goals, objectives and actions for restoring and maintaining biodiversity.

## **SETTING**

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### **MARINE HABITATS**

The Potrero Power Plant (Potrero PP) is located along the western shore of central San Francisco Bay in the City and County of San Francisco, California. San Francisco Bay estuary is the largest coastal embayment on the Pacific coast of the United States. The protected waters of San Francisco Bay provide habitat for a wide variety of aquatic species, including migratory and resident water birds and anadromous fishes. San Francisco Bay has two distinct estuarine reaches, the northern reach and the southern reach. The northern reach is dominated by seasonally variable flow from the Sacramento River (Davis 1982). The southern reach, or South Bay, receives only minor amounts of freshwater flow and is a tidally oscillating lagoon type estuary (Monroe and Kelly 1992). Central Bay, between the two reaches, is more oceanic in character because of the large influx of ocean water through the Golden Gate (Davis 1982).

The Potrero PP site is within a complex of shipping terminals. The shoreline in the vicinity of the Potrero PP has been modified by the construction of piers, wharves, bulkheads, and landfill. Much of the shoreline in the area has been stabilized with riprap and broken concrete. At the power plant, the riprapped shoreline immediately grades into softer sediments of sand and mud in the adjacent offshore subtidal areas.

The applicant's marine biological consultant, Tenera Environmental Services (MIRANT2001BioSamp3, pages 3-1 to 3-10) surveyed the rocky intertidal community in the vicinity of the Potrero PP in February 2001. All areas surveyed were characterized by a low diversity of algae and invertebrates. Sessile invertebrates included barnacles (primarily *Balanus* spp.), the rock jingle (*Pododesmus cepio*), and the bay mussel (*Mytilus galloprovincialis*). Shorecrabs (*Pachygrapsus* sp. and *Hemigrapsus* sp.) were occasionally observed underneath cobbles. Common species of algae included the rockweed (*Fucus gardneri*), green algae (*Ulva* spp. and *Enteromorpha* sp.) and three species of red algae (*Ceramium* sp., *Mastocarpus papillatus* and *Gelidium coulteri*). Although the diversity of algae was low, abundance was high.

The substrate of the subtidal zone in the vicinity of the Potrero PP consists of gravel, shell debris, sand, and mud. Recent grab samples of the bay bottom in the vicinity of the Potrero PP showed that sediments in the vicinity of the power plant are comprised

primarily of silt sized particles (MIRANT2001BioSamp3, page 2-8). Near the bay channel where tidal currents prevent settlement and deposition of fine sediments, medium to coarse-grained sand occurs.

The soft bottom supports infaunal invertebrates that live within the sand and epifaunal invertebrates that live on top of the sand. A total of 145 taxa of infaunal invertebrates were identified from the recent grab samples near the Potrero PP (MIRANT2001BioSamp3, page 2-3). The most abundant taxa were the tube building amphipod *Ampelisca abdita*, the polychaete worm *Exogone lourei*, and oligochaete worms of the family Tubificidae. Aquatic Biological Resources Table 1 lists the ten most abundant infaunal species collected in the vicinity of the Potrero PP. In general, the infaunal invertebrate community near the Potrero PP was characteristic of the Central Bay muddy sub-assemblage described by Thompson et al (1999) as characteristic of fine grained substrate in Central San Francisco Bay.

**AQUATIC BIOLOGICAL RESOURCES Table 1. Most Abundant Infaunal Species Collected Near the Potrero PP in December 2000 (MIRANT2001BioSamp3, page 2-5)**

<u>Phylum</u>	<u>Species</u>	<u>Percent Abundance</u>
<b>Arthropoda</b>	<i>Ampelisca abdita</i>	<b>14.3%</b>
<b>Annelida</b>	<i>Exogone lourei</i>	<b>12.2%</b>
<b>Annelida</b>	Tubificidae	<b>11.2%</b>
<b>Annelida</b>	<i>Sphaerosyllis californiensis</i>	<b>9.3%</b>
<b>Nematoda</b>	Nematoda unidentified	<b>9.3%</b>
<b>Arthropoda</b>	<i>Corophium heteroceratum</i>	<b>7.4%</b>
<b>Annelida</b>	<i>Cirriformia spirabanchia</i>	<b>4.3%</b>
<b>Arthropoda</b>	<i>Eudorella pacifica</i>	<b>3.7%</b>
<b>Annelida</b>	<i>Mediomastus</i> spp.	<b>3.4%</b>
<b>Annelida</b>	<i>Dorvillea rudolphi</i>	<b>3.3%</b>

Epifaunal invertebrates in the vicinity of the Potrero PP were sampled by crab trap and otter trawl in 1989 and 1990. The most abundant species collected in the crab traps were rock crabs (*Cancer antennarius*, *Cancer productus*, and *Cancer gracilis*) (SECAL 2000a, AFC Appendix G page 55). The most abundant invertebrate species collected in otter trawls were bay shrimp (*Crangon nigromaculata* and *Crangon* spp.). There is a live bait fishery for bay shrimp in San Francisco Bay (Chambers Group 1994). Key fishing locations include South Bay, northwestern San Pablo Bay and Carquinez Strait.

In January 2001, Tenera started conducting monthly trawl surveys to update information on marine resources in the vicinity of the Potrero PP. Results of the surveys from January through November 2001 have been submitted (MIRANT2001BioSamp12, page 20-30). Epifaunal invertebrates collected by trawls in the vicinity of the Potrero PP included many shrimp (primarily *Crangon nigricauda* and *Heptacarpus stimpsoni*), slender crabs (*Cancer gracilis*), spider crabs (Majidae), a few rock crabs (*Cancer antennarius* and *Cancer productus*), and substantial numbers of Dungeness crab (*Cancer magister*), a species of commercial importance (MIRANT2001BioSamp12, pages 20-30). Dungeness crab ranged in size of carapace width from less than 11 mm.

to 160 mm. Dungeness crabs are ready to recruit into the fishery at a size of about 146 to 152 mm (CDFG2001PSAComm, Comment No. DFG 13). Most of the Dungeness crabs collected were in the 60 mm to 107 mm size range. Only two individuals exceeded 140 mm. Dungeness crabs were collected in every survey, but were most abundant in the January and February surveys.

Otter trawls to collect demersal (bottom dwelling) fishes in the vicinity of the Potrero PP were conducted monthly from January through November of 2001. Bay goby (*Lepidogobius lepidus*), which comprised 52 percent of the total number of fishes caught, were the most abundant species (MIRANT2001BioSamp12, page 37). The only other species caught in substantial numbers were speckled sanddab (*Citharichthys stigmaeus*) (23 percent of the total), English sole (*Pleuronectes vetulus*) (9 percent of the total), shiner surfperch (*Cymatogaster aggregata*) (5 percent), plainfin midshipmen (*Porichthys notatus*) (4 percent) and Pacific staghorn sculpin (*Leptocottus armatus*) (3 percent). Forty other species of fish were caught in low numbers. These other species combined accounted for only 4 percent of the total catch.

Midwater trawls were conducted monthly (with the exception of March and September) near the Potrero PP from January through November of 2001 to sample water column fishes. The most abundant fish species caught were northern anchovy (*Engraulis mordax*) (69 percent of the catch) and Pacific herring (*Clupea pallasii*) (29 percent of the catch) (MIRANT2001BioSamp12, page 36). The remaining two percent of the catch consisted of sixteen other species. Nine Chinook salmon (*Oncorhynchus tshawytscha*) were collected in May and June. All the salmon were small individuals between 74 and 97 mm in length (MIRANT 2001 BioSamp10, Page 13-14).

The three most abundant water column species collected near the Potrero PP by gill net in 1989 and 1990 were northern anchovy, Pacific herring, and white croaker (*Genyonemus lineatus*) (SECAL 2000a, AFC Appendix G page 52).

San Francisco Bay waters in the vicinity of the Potrero PP also support a number of species of sharks and rays. Historic shark and ray derbies held at Hunters Point and Coyote Point indicate that sharks and rays are prevalent within the area (CDFG 2001PSAComm, Comment No. DFG 12). The sampling methods used in the recent surveys are not particularly efficient at capturing sharks and rays. One bat ray (*Myliobatis californica*) was collected in the midwater trawls (MIRANT 2001 BioSamp12, Page 19) and one bat ray, four big skate (*Raja binoculata*), four Pacific electric rays (*Torpedo californica*) and one thornback ray (*Platyrrhinoides triseriata*) were collected in the otter trawls (MIRANT 2001 BioSamp12, Page 20-30). The gill net sampling conducted near the Potrero PP in 1989 and 1990 collected substantial numbers of brown smoothhound (*Mustelus henlei*) (SECAL 2000a, AFC Appendix G page 52). Gill netting is more effective at capturing sharks and rays than trawls.

Larval fishes and megalopal crabs in the vicinity of the Potrero PP were collected in January through November of 2001. Data are available for January through September. Yellowfin goby (*Acanthogobius flavimanus*), unidentified gobies and bay goby were the most abundant larval fish species (21 percent each) in the vicinity of the Potrero PP, followed by Pacific herring (18 percent), northern anchovy (13 percent), and white croaker (3 percent) (MIRANT2001BioSamp12, page 33). Forty-six other taxa of



larval fishes were collected near the Potrero PP accounting for the remaining 3 percent of the catch.

Larval crab species collected near the Potrero PP included brown rock crab (*Cancer antennarius*) (73 percent of the total crab catch), yellow rock crab (*Cancer anthonyi*) (15 percent), European green crab (*Carcinus maenas*) (6 percent) and hairy rock crab (*C. jordanii*) (6 percent) (MIRANT2001BioSamp12, page 34).

Pacific herring spawn in the vicinity of the Potrero PP. They lay their adhesive eggs in shallow water on hard substrate or on marine vegetation. Pacific herring support an important commercial fishery in San Francisco Bay. The focus of the herring fishery is the roe, which is exported to Japan. About 90 percent of the herring landed in California ports are caught in San Francisco Bay. Herring fishing activity occurs during spawning, generally December through March (Chambers Group 1994). There is also recreational fishing for Pacific herring in San Francisco Bay. In addition to their importance to local fisheries, Pacific herring are an important forage fish for many larger fishes, fish-eating birds, and marine mammals.

Herring spawning events in recent years have occurred consistently in the vicinity of the Potrero PP (CDFG 2001PSAComm, Comment No. DFG 15). A survey of herring eggs near the Potrero PP in 1990 estimated that 21,660,000,000 eggs were deposited near the power plant site following a January 3 through 6, 1990, spawning event (SECAL 2000a, AFC page 61). The total egg deposition near the plant represented less than 1.5 percent of the total number of eggs estimated by the CDFG to have been deposited throughout San Francisco Bay during that spawning event. In the 2000 to 2001 spawning season, there were two recorded spawning events south of the Bay Bridge (MIRANT 2001PSAComm, PSA Comment No. MIRANT 4B). The first event was on December 20, 2000 and occurred from South Beach Marina to Pier 32, and the second recorded event was February 5, 2001, at Candlestick Point, Hunters Point, and Oyster Point.

The protected waters of San Francisco Bay provide important habitat for resident and migratory water birds. The avifauna of open water in the vicinity of the Potrero PP includes loons and grebes, pelicans and cormorants, gulls and terns, and a variety of waterfowl including ducks and scoters. Scaup and scoters, which are winter migrants, account for approximately 90 percent or more of the waterfowl in the open water of Central Bay (Chambers Group 1994).

Western gulls (*Larus occidentalis*) breed along the shore in the vicinity of the project site including a small colony at Potrero Point (Carter et al 1992). Other seabird breeding colonies near Potrero include pelagic cormorants (*Phalacrocorax pelagicus*) and Brandt's cormorants (*P. pencillatus*) on Yerba Buena Island, a large double-crested cormorant (*P. auritus*) colony on the Bay Bridge, and California least tern (*Sterna antillarum browni*) and Caspian tern (*S. caspia*) colonies across the bay at the former Alameda Naval Air Station.

During their March 10, 2000, reconnaissance survey, the applicant's biologists observed western gulls flying over the open water in the vicinity of the Potrero PP (SECAL 2000b, AFC Supplement pages 8.2-4-8.2-5). North of the site they saw Brandt's cormorants,

American coots (*Fulica americana*), western grebes (*Aechmophorus occidentalis*) and surf scoters (*Melanitta perspicillata*) swimming in the open water and Canada geese (*Branta canadensis*) on the piers. Waterbirds observed in the vicinity of Islais Creek, south of the Potrero PP, included least sandpipers (*Calidris minutilla*), western sandpipers (*C. mauri*), and spotted sandpipers (*Actitis macularia*) on the mudflats and ring-necked ducks (*Aythya collaris*), lesser scaups (*A. affinis*), western grebes, eared grebes (*Podiceps nigricollis*), and common golden eye (*Bucephala clangula*) swimming in the creek. Lesser scaups and ruddy ducks (*Oxyura jamaicensis*) were observed in open water adjacent to Islais Creek.

Common marine mammal species in San Francisco Bay include harbor seals (*Phoca vitulina*) and California sea lions (*Zalophus californianus*). Harbor seals use San Francisco Bay for foraging, resting, and breeding. Large numbers of harbor seals haul out at Yerba Buena Island in Central Bay where up to 213 seals have been counted on land (Green et al 1999). A harbor seal was observed near the Potrero site during the March 2000 reconnaissance survey (SECAL 2000b, AFC Supplement page 8.2-5).

California sea lions have become a conspicuous part of the San Francisco Bay marine mammal fauna within the last 15 years. This species has a large and growing population breeding in the summer on island rookeries in southern California (Bonnell and Dailey 1993). A portion of this breeding population, mostly adult and sub-adult males, migrates northward in the fall. Relatively small numbers establish themselves in the San Francisco Bay Area (less than 2,000 animals) (Chambers Group 1994).

The harbor porpoise (*Phocoena phocoena*) was once a common species in San Francisco Bay and apparently still uses these waters, but sightings in recent years are relatively rare (Szczepaniak and Webber 1985). Gray whales (*Eschrichtius robustus*) and humpback whales (*Megaptera novaeangliae*) may occasionally wander into San Francisco Bay, but do not typically occur there.

## SENSITIVE SPECIES

Aquatic Biological Resources Table 2 lists sensitive aquatic species of San Francisco Bay.

**AQUATIC BIOLOGICAL RESOURCES Table 2: Sensitive Aquatic Species  
Potentially Occurring in the Project Vicinity**

<b>Scientific Name</b>	<b>Common Name</b>	<b>Status*</b>
<b>OSTEICHTHYES</b>	<b>BONY FISHES</b>	
<i>Acpenser medirostris</i>	Green sturgeon	FSC, SSC
<i>Hypomesus transpacificus</i>	Delta smelt	FT, ST
<i>Spirinichus thaleichthys</i>	Longfin smelt	FSC, SSC
<i>Oncorhynchus tshawytscha</i>	Chinook salmon	
	Winter run	FE, SE
	Spring run	FT, ST
	Central Valley fall/late fall run	FC, SSC
<i>Oncorhynchus mykiss</i>	Steelhead	
	Central California Coast Evolutionarily Significant Unit	FT

	(ESU)	
	Central Valley ESU	FT
<i>Eucyclogobius newberryi</i>	Tidewater goby	FPD, SSC
<i>Pogonichthys macrolepidotus</i>	Sacramento splittail	FT, SSC
<b>AVES</b>	<b>BIRDS</b>	
<i>Gavis immer</i>	Common loon	SSC
<i>Pelecanus occidentalis californicus</i>	California brown pelican	FE, SE
<i>Phalacrocorax auritus</i>	Double-crested cormorant	SSC
<i>Branta canadensis leucoparcia</i>	Aleutian Canada goose	FPD
<i>Bucephalia islandica</i>	Barrow's goldeneye	SSC
<i>Charadrius alexandrinus nivosus</i>	Western snowy plover	FT, SSC
<i>Numenius americanus</i>	Long-billed curlew	SSC
<i>Larus californicus</i>	California gull	SSC
<i>Sterna elegans</i>	Elegant tern	FSC, SSC
<i>Sterna antillarum browni</i>	California least tern	FE, SE
<b>MAMMALIA</b>	<b>MAMMALS</b>	
<i>Megaptera novaeangliae</i>	Humpback whale	FE

\* **Status Legend:** **FE** = Federal Endangered, **FT** = Federal Threatened, **SE** = State Endangered, **ST** = State threatened, **FC** = Federal Candidate, **FPD** = Federal Proposed Delisted, **FSC** = Federal Species of Concern, and **SSC** = State Species of Concern

Sensitive fish species that may occur in the vicinity of the Potrero PP intake and discharge structures include green sturgeon (*Acpenser medirostris*), longfin smelt (*Spirinichus thaleichthys*), Chinook salmon (*Oncorhynchus tshawaytscha*) and steelhead (*Oncorhynchus mykiss*).

The San Francisco Bay estuary supports the southernmost reproducing population of green sturgeon, a Federal Species of Concern and California Species of Special Concern (Moyle and Yoshiyama 1992). Green sturgeon spawn in the Sacramento River and spend most of their lives in the ocean. Within San Francisco Bay they generally would be expected to occur in the northern portion between the Golden Gate and the Sacramento-San Joaquin River Delta. No green sturgeon have been collected in any surveys near the Potrero PP (SECAL 2000b, AFC Supplement p. 8.2-13, (MIRANT2001BioSamp12, page 15 through 30). However, individual green sturgeon may on rare occasions swim into the area.

Longfin smelt are a Federal Species of Concern and California Species of Special Concern. Adult longfin smelt are broadly distributed throughout San Francisco Bay, but use the river channels of the Delta for spawning. They were collected in recent midwater trawls and otter trawls in the vicinity of the Potrero PP (MIRANT2001BioSamp12, page 15, 16, and 19), and presumably occur regularly in the project area.

Chinook salmon move from the Pacific Ocean through San Francisco Bay to the tributaries and upper reaches of the Sacramento River and, to a lesser extent, to the San Joaquin River where they spawn and die. When they are about 1 year old, the smolts move downstream through the estuary to the ocean. San Francisco Estuary supports four genetically distinct runs designated by the season in which they enter fresh water to spawn. The winter run is both Federal and State Endangered. The

spring run is Federal and State Threatened. The Central Valley fall and late fall runs are Federal Candidates for listing and California Species of Special Concern.

In addition to the Chinook salmon that spawn in the Sacramento and San Joaquin Rivers and their tributaries, small numbers of Chinook salmon spawn in streams that discharge into South San Francisco Bay, primarily the Guadalupe River and Coyote Creek (San Francisco Estuary Project 1997). The genetic origin of the salmon that run in South Bay streams is not clear, but they are thought to be either fall run salmon or of hatchery origin or perhaps a combination of both (B. Mulvey, NMFS, pers. communication 2001).

Although within San Francisco Bay, Chinook salmon would be expected to occur most frequently in the waters between the Golden Gate and the Delta, they are sometimes found in the vicinity of the Potrero PP. Chinook salmon were collected in May and June 2001 in the midwater trawls in the vicinity of the Potrero PP (MIRANT 2001 BioSamp12, Page 16-17). Based on established length criteria developed for assigning run categories, CDFG personnel determined that all salmon caught were fall-run Chinook salmon. Chinook salmon have also been impinged on the intake of the nearby Hunters Point Power Plant (SECAL 2000a, AFC Appendix G Page 139).

Steelhead are anadromous rainbow trout that hatch in freshwater, swim downstream to spend their adult lives in the ocean and return to freshwater to spawn. Two genetically distinct populations of steelhead occur in San Francisco Bay. Both populations are listed as Threatened by the federal government. The Central Valley Evolutionarily Significant Unit (ESU) includes steelhead that spawn in the Sacramento and San Joaquin Rivers and their tributaries. The Central California Coast ESU includes steelhead that run in coastal basins from the Russian River, south to Soquel Creek and in streams of the San Francisco and San Pablo Basins. Currently, small steelhead runs exist in the South Bay in San Francisquito Creek, the Guadalupe River, Coyote Creek and Permanente Creek as well as in several streams in Central Bay and San Pablo Bay. The project area is within Designated Critical Habitat for the Central California Coast ESU. Steelhead spawning in South Bay streams might pass through the project area on their way to their spawning streams, and juveniles may also pass through the area on their migration out to the ocean. Steelhead have not been collected in any of the fish surveys at the Potrero PP, but they have been impinged at the intake of the nearby Hunters Point Power Plant (SECAL 2000a, AFC Appendix G Page 139).

Three other sensitive San Francisco Bay fish species, Delta smelt (*Hypomesus transpacificus*), tidewater goby (*Eucyclobobius newberryi*), and Sacramento splittail (*Pogonichthys macrolepidotus*) would not be expected near the Potrero PP. The range of the Delta smelt is from the Sacramento and San Joaquin Rivers downstream to Suisun Bay (Monroe and Kelly 1992). During periods of high river flow, some individuals are washed into San Pablo Bay. Delta smelt would not be expected as far west as Central Bay. Tidewater gobies live in brackish water in shallow lagoons and lower stream reaches. They have not been found in recent surveys of San Francisco Bay streams and may be extinct in the Bay and its drainages (San Francisco Estuary Project 1997). Sacramento splittail are primarily freshwater fish that are largely confined to brackish and freshwater habitats of the Delta, Suisun Bay, and Suisun Marsh (Moyle et al 1989).

Sensitive seabird species likely to occur in the vicinity of the Potrero PP include double-crested cormorant, California least tern, common loon (*Gavis immer*), California brown pelican (*Pelecanus occidentalis californicus*), California gull (*Larus californicus*), Barrows goldeneye (*Bucephalia islandica*), and elegant tern (*Sterna elegans*).

Double-crested cormorants are a California Species of Special Concern. A large colony breeds on the Bay Bridge, approximately 2 miles north of the Potrero PP. They would be expected to forage frequently within the project area.

The Federal and State Endangered California least tern breeds across the Bay from the Potrero PP at the former Alameda Naval Air Station. California least terns winter in Central and South America and are present at their California breeding colonies between April and August. They forage in the waters near their breeding colony. Terns from the Alameda colony might forage occasionally in the vicinity of the Potrero PP.

The Federal and State Endangered California brown pelican breeds in the spring on islands in southern California and Mexico and migrates north after the breeding season. They are common in San Francisco Bay where they forage over open water and roost on many breakwaters and piers. They would be expected in the vicinity of the Potrero PP.

A number of bird species of special concern visit San Francisco Bay during the non-breeding season and would be expected near the Potrero PP. These include common loon, California gull, elegant tern, and Barrow's goldeneye. Other sensitive bird species including the Federal Threatened Aleutian Canada goose (*Branta canadensis*) (proposed for delisting), the Federal Threatened western snowy plover (*Charadrius alexandrinus nivosus*), and the long-billed curlew (*Numenius americanus*), a California species of Special Concern, would be unlikely to occur in the immediate vicinity of the Potrero PP because of a lack of appropriate habitat. Long-billed curlews may forage in mudflats at Islais Creek south of the power plant. Canada geese have been observed near the Potrero PP, however the Aleutian subspecies that occur seasonally in the San Francisco Bay area are generally birds that winter in the Sacramento and San Joaquin Valleys (Small 1994).

## IMPACTS

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### DIRECT AND INDIRECT IMPACTS

The California Environmental Quality Act Guidelines define direct impacts as those impacts that result from the project and occur at the same time and place. Indirect impacts are caused by the project, but can occur later in time or farther removed in distance, but are still reasonably foreseeable and related to the project. The potential impacts discussed below are those most likely to be associated with construction and operation of the project.

## **Marine Construction**

The proposed project would include, but not be limited to, the construction of new cooling water intake and discharge systems and the construction of a transmission cable line, a portion of which would be installed under Islais Creek. Marine construction is expected to occur over an 18 to 24 month period.

### **Cooling Water Intake System**

A proposed new intake structure with sufficient capacity for withdrawal of Bay water for cooling of both Units 3 and 7 would be constructed to replace the existing Unit 3 intake. The existing Unit 3 outfall would be replaced with a new offshore diffuser and a second offshore diffuser would be constructed for the Unit 7 discharge.

The existing Unit 3 cooling water intake structure would be abandoned in place. The new combined Unit 3 and Unit 7 intake structure would be constructed south of the current Unit 3 cooling water discharge location. The intake structure would consist of an intake chamber approximately 200 feet long opening into a series of traveling screens and four, 50 percent flow circulating water pumps. The screen mesh would be approximately 5/32 inch (4 millimeters). The water flow approach to the screens would be about 0.4 foot per second.

Construction of the cooling water intake structure for the Unit 7 project would occur inside a cofferdam that would be enclosed in a silt curtain. The area enclosed by the cofferdam would be de-watered. The area inside the perimeter of the cofferdam would be excavated and a concrete base slab would be constructed. The intake structure would be constructed inside the cofferdam. The concrete for the perimeter walls of the structure would be placed directly against the inner wall of sheet piling of the cofferdam. Once the structure is complete, the outer wall of sheet pile and the sheet piling above the intake screens on the inner wall would be removed.

Approximately 5,900 cubic yards of material in the area in front of the intake structure would be dredged to depths agreed upon with the U.S. Army Corps of Engineers/Dredged Material Management Office (DMMO) in conjunction with the dredging permit process. Dual silt screens would be placed around all dredging operations to contain re-suspended sediment. The silt curtains would consist of two customized, permeable screens that would surround the full length of the dredging area to provide full enclosure. The two screens would be anchored at the Bay bottom using a chain or other heavy flexible device. To prevent water from spilling over the top of the screens, a flotation log would be attached to the top. The inner screen would be held in place by anchor piles, and the outer screen would be held away from the inner screen by rigid strut spacers. Silt curtains would be installed prior to dredging and would remain in place until in-water construction is completed and turbidity levels returned to ambient. All dredged material would be disposed of at an upland site. The Altamont Landfill and Resources Recovery Facility in Livermore has been identified as the disposal facility that would receive the material (MIRANT2001Dresp5, Data Response No. 196).

Intertidal organisms that live in the concrete rubble where the new intake would be constructed would be destroyed by de-watering, the placement of the cofferdam, and

construction of the intake structures. Sessile organisms within this approximately 0.15-acre area (linear distance about 200 feet) include barnacles, rock jingles, rockweed and various species of red and green algae. Mobile organisms such as shore crabs may be able to escape.

The concrete rubble grades into soft bottom habitat in the shallow subtidal. Approximately 0.09 acres of soft bottom habitat would be permanently lost by construction of the intake structure. Soft bottom organisms would also be destroyed within the approximately 0.4-acre area that would be dredged in front of the intake structure. Grab samples taken in soft bottom habitat in the vicinity of the area that would be disturbed by intake construction were dominated by nematode worms, oligochaete worms, and the polychaete worm *Exogone lourei*. To avoid exposing sediments with high levels of polyaromatic hydrocarbon (PAH) compounds, this area would be covered by an engineered cap consisting of clean bay mud topped by six inches of a mud-sand mixture.

After the completion of construction, the area within the dredge footprint would be re-colonized by benthic organisms. The benthic community within the dredged area would be expected to be similar to that before dredging. Oligochaetes and nematodes are opportunistic organisms that rapidly colonize disturbed areas. Some of the less opportunistic species may take longer to re-colonize. Therefore, it is expected that the dredging would lead to at least a temporary decrease in benthic species diversity within the dredge footprint. Furthermore, because the sand in the engineered cap would provide for a different sediment composition than was previously in the area, the community may be somewhat different to the one that inhabited the area prior to construction. Recolonization of the dredged area would occur immediately by mobile species in adjacent areas. However, re-establishment of a relatively stable benthic community in the San Francisco Bay environment has been estimated to take between several months and several years (USACE, USEPA, BCDC, SFBWQCB, SWRCB 1998). In addition, because San Francisco Bay has been invaded by numerous aggressive exotic species, there is the potential that disturbance by dredging could provide an opportunity for some of these species to recolonize the dredge footprint and preclude native species. Because the dredge footprint is small, these impacts are considered adverse but insignificant. Maintenance dredging is not expected to be required in front of the intake.

Most mobile organisms would be able to escape the dredge. There is some potential that small crabs, including Dungeness crabs, may become entrained by the dredge. Observations of dredging operations have not indicated that the dredge entrains large numbers of crabs. The impact of dredging on Dungeness crab would probably be limited to a few individuals and would be expected to be insignificant.

### **cooling water discharge system**

Separate cooling water discharges are proposed to be constructed for Unit 3 and Unit 7. The discharge for Unit 3 would replace the current shoreline outfall structure. Each proposed discharge would consist of a pair of 54-inch diameter pipes laid on the bottom of the Bay and extending off shore approximately 900 feet to a depth of between 20 and 28 feet Mean Lower Low Water (MLLW). The last 200 feet of the pipe would be

equipped with multiple diffuser ports. The 30 feet length of pipe closest to the shoreline would be covered with riprap. The more offshore portions of the pipes will be covered with a gravel marine mattress.

The outlet structures for the cooling water discharge would be placed on land. The transition from the onshore conduits to the offshore discharge pipes would be constructed using a cofferdam similar to that used to construct the intake structure. The discharge pipes would be placed directly on the Bay bottom and held in place with either the riprap or the marine mattress. No dredging would be required for the Unit 7 discharge. Approximately 190 cubic yards would be dredged to lay the pipelines for the Unit 3 discharge.

Most of the soft bottom benthic organisms within the approximately 3.4-acre footprint of the discharge pipes would be lost by construction of the outfall. Soft bottom habitat within the outfall footprint would be permanently converted to hard bottom substrate.

In addition to the direct effects of construction on organisms within the intake and outfall construction and dredging footprints, dredging and in-water construction activities would disturb aquatic organisms in the vicinity of the construction.

Turbidity created by the re-suspension of sediments during dredging and in-water construction can bury sessile organisms, reduce the light levels available for photosynthesis of algae, clog the gills and feeding structures of aquatic animals, and interfere with the foraging activities of piscivorous (fish eating) seabirds and marine mammals. Contaminants in re-suspended sediments also may be released into the water column and become bioavailable. Because dredging and construction would be done within a silt curtain, most of the re-suspended sediments would be contained within the immediate construction area. Turbidity would be monitored outside the silt curtains to verify that the devices were effectively containing turbidity (MIRANT2001Dresp5, Data Response No. 195). If turbidity outside the silt curtain exceeds ambient, remedial measures would be taken to reduce turbidity. Therefore, the impacts of turbidity would be limited to the area disturbed directly by construction, and would be insignificant.

The noise and activity of construction may alter the behavior of fishes or cause them to avoid the construction area temporarily. Ford and Platter Rieger (1986) studied the reaction of schooling fishes to pile driving. Pile driving had no apparent effect on the behavior of topsmelt (*Atherinops affinis*). However, northern anchovy exposed to pile driving sounds at close range altered their behavior and seemed agitated. There was a consistent tendency for anchovy to move away from the main pile driving sound source. Feist et al (1996) studied the effects of pile driving on juvenile salmonids. The authors determined that salmonids were capable of detecting the sound of drop-hammer pile driving at least 600 meters away, and that the sound was substantially above ambient levels at 593 meters. Juvenile salmon did not change their distance from shore or cease foraging in response to pile driving, but on pile-driving days there were nearly half the number of fish schools on the construction side of the site than on non-pile driving days. Fish surveys were done immediately following a dredging program in Marina del Rey Harbor in Los Angeles County (Soule et al. 1993). An unusually low number of fish species were collected, and the investigators concluded that the dredging had disturbed



the fishes. When fishes in the area were sampled again a few months later, the number of fish species collected had returned to normal. These studies suggest that fishes would avoid areas of dredging and construction activity but return when the activity ceases. Therefore, the disturbance to fishes from dredging and in-water construction would be expected to be short term and insignificant.

The temporary impacts of construction on most fish and aquatic invertebrate species are expected to be insignificant because of the limited area that would be affected (approximately 5 acres). However, there is a potential that construction could interfere with herring spawning or salmonid migration. Interference with either of these activities could be a potentially significant impact.

Seabirds and marine mammals may avoid the construction area during the 18 to 24 months of in-water construction although birds and marine mammals in San Francisco Bay are accustomed to a high level of activity. The area that would be disturbed by construction is small and it is not known to be an important foraging area for any bird or mammal species. Therefore, the impacts of construction on seabirds and marine mammals are expected to be insignificant.

In addition to turbidity and disturbance, there is a concern that dredging may result in the exposure or spread of contaminants that may be present in the dredged sediments. High concentrations of polyaromatic hydrocarbons (PAH) have been found in sediments offshore Potrero PP (SECAL 2000, Sediments 1, page 11). Other contaminants were at or near background levels. PAH concentrations generally increased with depth. The highest concentrations of PAH compounds were found near to the shoreline, particularly within 100 feet of shore (MIRANT 2001 CoolingWater p.3).

PAH compounds are carcinogenic and mutagenic and may bioaccumulate (Monroe and Kelly 1992). Acute toxicity to saltwater aquatic life occurs at concentrations as low as 300 micrograms per liter in the water (Environmental Protection Agency 1986). Sublethal effects on aquatic organisms at lower concentrations are likely but have not been well defined.

The high level of PAHs in the project area is an existing condition related to past practices on the site. Construction of the intake structure and removal of sediments behind the cofferdam may decrease the exposure of aquatic organisms to PAHs within the footprint of the intake structure. The spread of contaminated sediments during dredging is unlikely because of the use of a silt curtain to contain the dredged sediments. However, because PAH concentrations increase with depth, dredging has the potential to expose contaminated sediments that presently are buried. Based on characterization of contaminants in the sediments, the applicant relocated the new intake to an area with lower PAH concentrations to reduce the removal and exposure of contaminated sediment (MIRANT 2001 CoolingWater p. 2). Furthermore, exposure of contaminated sediments within the dredge footprint in front of the intake would be addressed by covering any area of elevated PAH concentration with an engineered cap of clean sand and mud. Therefore, project construction would not be expected to expose aquatic organisms to elevated levels of PAH compounds.

## **Cable Construction Under Islais Creek**

Cables would be installed by boring under Islais Creek. Islais Creek sediments are highly contaminated with hydrocarbons (San Francisco Estuary Project 1991). If the bore is near the surface, a structural failure, called a “frac-out”, can occur. The CDFG has expressed concern that construction near Islais Creek may have the potential to suspend contaminants present in creek sediments (B. Ota personal communication 2000). Staff submitted a data request asking the applicant to describe the procedures that would be used to avoid contamination of Bay waters in the event of a frac-out when boring under Islais Creek (CEC2000DReq3, Data Request No.167). The applicant responded that the potential for “frac-out “ is low when boring in soft sediments such as the bay mud found under Islais Creek (SEP 2001Dresp3, Data Response No.167). The data response also addressed the cleanup of the drilling fluids if a frac-out occurs. However, the data response did not address the containment of contaminated creek sediments if a frac-out occurs and cleanup is needed.

## **Permanent Changes to Bay Habitat**

As described above under construction impacts, the construction of the new intake and discharge structures would result in some permanent changes in Bay habitat. The construction of the intake structure would result in the permanent loss of approximately 0.24 acres of Bay habitat. About 0.15 acres of the habitat (covering a linear distance of about 200 feet of shoreline) that would be permanently lost is concrete rubble that supports a relatively depauperate rocky intertidal community of barnacles, mussels, rock jingles, shore crabs and algae. Some hard bottom organisms such as barnacles, mussels and some species of algae would be expected to colonize the intertidal and subtidal portions of the new intake structure. However, because of the lack of relief, the intertidal community on the intake structure would be expected to be even less diverse than the one on the concrete rubble.

About 0.09 acres of low intertidal/shallow subtidal habitat also would be filled by construction of the new intake structure. The soft bottom habitat supports a relatively diverse assemblage dominated by nematode, oligochaete and polychaete worms (MIRANT2001BioSamp3, page 2-7).

Because San Francisco Bay is a unique estuarine ecosystem that supports many sensitive species, permanent loss of Bay habitat is considered a significant impact. For the fill of Bay habitat, the applicant would be required to obtain a permit from the USACE. The USACE, and the resource agencies, with which it consults, will require compensatory mitigation for the loss of Bay habitat.

Construction of the discharge would replace approximately 3.2 acres of soft bottom habitat with hard bottom habitat. In the approximately 0.12 acres closest to shore, the pipes would be covered with riprap. This riprap would provide relatively high quality hard bottom habitat. Encrusting invertebrates and algae would colonize the rocks. The crevices between the rocks would provide shelter for demersal fishes and mobile invertebrates such as crabs. Fishes associated with hard bottom would be attracted to the riprap. The remaining approximately 3.08 acres of pipeline that would be covered by a gravel mat also would provide hard bottom habitat but of lower quality than the riprap. Algae and sessile invertebrates would grow on the mat and fishes would be

attracted to the structure of the pipe. However, the mat would not have crevices to shelter crabs and fishes. The lower relief and smoother surface of the mattress would be less attractive to fishes than the riprap. Although construction of these submerged structures would not preclude the use of bay waters by species associated with the water column, and the structures themselves would provide additional habitat for hard bottom species, construction of the outfalls results in the replacement of natural bay bottom with artificial habitat. The construction of numerous piers, jetties, pipes and other structures has resulted in a substantial cumulative loss of natural bay soft bottom. The proposed new outfalls, thus, would add to cumulative losses of natural habitat in San Francisco Bay.

An intervener, Communities for a Better Environment (CBE), submitted a data request asking how attraction to the outfall might affect what anglers might catch (CBE2001DReqCEC1 Data Request No. 72). The applicant responded that few anglers fish in the immediate vicinity of the Potrero PP and that little change in fish distribution relative to the new outfall would be expected (Mirant 2001DRespCBE, Data Response No. 72). Staff concurs with the applicant's response. The amount of hard bottom habitat created by construction of the outfall is only 3.2 acres, of which only the 0.12 acres of riprap will be highly attractive to hard bottom fishes. The number of fishes attracted away from shoreline riprap, piers, and other areas where anglers might fish would be limited to a few individuals. No perceptible impact on fishing success would be expected.

### **Impingement and Entrainment by the Cooling Water Intake**

Aquatic animals in the vicinity of the Potrero PP may be impinged on the intake screens or entrained in the cooling water that is drawn into the cooling water system. A 1978-1979 study of fishes and macroinvertebrates impinged at the Unit 3 intake showed that during the year sampled in the study, 55,611 fish with a total weight of 642.8 kilograms and 262,867 invertebrates were impinged (SECAL 2000a, AFC Appendix G page 78). The fish species impinged in the greatest numbers was northern anchovy. No state or federally listed fish species were impinged. The invertebrates impinged in the greatest number were rock crab (*Cancer antennarius*), blacktail shrimp (*Crangon nigricauda*), and red rock crab (*Cancer productus*).

Impingement of Chinook salmon and steelhead would be considered a significant impact because these species are listed or, in the case of the fall and late fall runs of Chinook salmon, candidates for listing. Staff submitted a data request asking the applicant to explain why Chinook salmon are impinged at the nearby Hunters Point intake but not at Potrero (CEC2000Dreq4, Data Request No. 170). The applicant responded that the long pre-intake conduits of the Hunters Point intake make the probability of impinging salmon and steelhead at Hunters Point significantly greater than at the Potrero PP (SEP2001DResp4, Data Response No. 170).

During the 1978-79 study of impingement at the Unit 3 intake, a total of 10,646 rock crabs (*Cancer antennarius* and *C. productus*) were impinged. Recent trawl surveys (2001) have collected large numbers of Dungeness crab in the vicinity of the Potrero PP. Impingement of significant numbers of Dungeness crab at the combined Unit 3 and Unit 7 intake may have an adverse impact on populations of this species within the Bay and ultimately on the crab fishery. In addition, 5,129 bay shrimp (*Crangon* spp.) were

impinged at the Unit 3 intake between 1978 and 1979. There may be a potential that the intake could impact the South Bay shrimp fishery.

The proposed new combined Unit 3 and Unit 7 intake would include features designed to reduce impingement. The approach velocity would not exceed 0.4 feet per second. This velocity is below the velocity requirement of 0.5 feet per second proposed by the USEPA in its Proposed Rules for Cooling Water Intake Structures for New Facilities (USEPA 2000). Many adult fishes can escape impingement at intake velocities below 0.5 feet per second. The maximum design approach velocity of 0.4 feet per second is also in compliance with NMFS screening criteria for fingerling salmonids (NMFS 2001). However, the approach velocity still may be too great to insure the safety of smaller salmonids (< 60 mm in length) that may be found in the project area (NMFS 2002). The NMFS recommends that to protect smaller salmonids, the approach velocity of the intake should not exceed 0.33 feet per second.

The proposed new Unit 3 and Unit 7 intake also would have a continuously rotating inclined screen design. These screens are expected to reduce the amount of debris buildup in front of the intake, which would reduce the number of organisms trapped in debris and allow more juvenile and adult organisms to avoid impingement (SECAL 2000a, AFC page 8.2-13). In addition, angling the screens decreases impingement losses since the fish tend to avoid the screen face and move toward the end of the screen line (USEPA 2001a). The applicant also proposes to reduce impingement losses by implementing a fish return system equipped with a low-pressure spray wash. It is not clear to what extent fishes returned to the Bay with this low-pressure spray wash system will survive. Some may be injured in the process. Inclined screens equipped with a fish return system have the potential to substantially reduce impingement mortality (as much as 80 to 90%) (USEPA 2001).

Although the new intake would include measures to protect aquatic life from impingement, the total cooling water flow of the new intake unit would exceed that of the existing Unit 3 intake. The greater flow may increase the potential for organisms to become impinged. In addition, a smaller screen mesh would be used for the new intake. The smaller mesh would reduce the size of organisms entrained but may increase impingement. The actual impacts of impingement at the new intake cannot be determined until the new intake is constructed and impingement of aquatic organisms documented.

A 1978-1979 study of entrainment at the Potrero PP intakes found that Pacific herring and gobies were the species entrained in the greatest numbers (SECAL 2000a, AFC Appendix G page 70). Staff believes that current data on the distribution and abundance of fish and crab larvae near the intake and in the source water are necessary to determine the impacts of the new intake on aquatic resources. Because the information on aquatic resources in the AFC was based on studies done more than 10 years ago, staff submitted a data request that the information be updated with new studies (CEC2000Dreq1, Data Request No. 16). An agreement was drafted between the applicant and staff stating that the applicant would collect fish and plankton data in the vicinity of the Potrero PP to update the information on aquatic resources obtained in previous surveys (CEC/SEP 2000 MOU 1). In January of 2001, Mirant initiated trawl

surveys to identify fish and macroinvertebrates that may be subjected to impingement and a study of larval fish and crabs to predict the impacts of entrainment.

The applicant has submitted a report analyzing the results of the first 6-months of larval fish and crab surveys (MIRANT2001Biosamp8). The purpose of the plankton surveys was to characterize the taxonomic composition and abundance of larval fishes and crabs that potentially would be entrained in the cooling water system of the Potrero PP and in the surrounding source water. Plankton samples collected from two locations in front of the existing and proposed Potrero PP intake structure provided an estimate of the total numbers and types of these organisms that would pass through the cooling water system. Data collected from stations within the surrounding waters of northern South Bay were used to estimate the abundance of fish larvae and megalopal cancer crabs at risk of entrainment. The combination of estimates of entrained and entrainable larval abundance provides estimates of fractional losses that can be assessed for potential impacts on local fisheries. Entrainment effects of cooling water intake systems were evaluated using three methods, all of which assumed 100 percent entrainment mortality. Estimates of larval fish concentrations sampled at the Potrero PP intake were multiplied by the Unit 3 and the projected Unit 7 intake volumes to provide estimates of potential entrainment. The three analytical techniques used to determine losses were Proportional Entrainment (PE), Adult Equivalent Loss (AEL) and Fecundity Hindcasting (FH).

By comparing the number of larvae withdrawn by the power plant to the number estimated to be in the source water, an estimate of conditional mortality due to entrainment (PE) can be generated for each taxon or species. These estimates of conditional mortality were combined using the Empirical Transport Model to provide an estimate of the annual probability of mortality due to entrainment ( $P_m$ ) for each taxon or species. The Empirical Transport Model includes estimates of the number of entrained larvae, the number of larvae in the source water population at risk of entrainment, and an estimate of the period of time that the larvae are subject to entrainment. Entrainment losses also were estimated from total larval entrainment at the Potrero PP using FH and AEL models. These models require life stage and species-specific estimates of age, growth, fecundity, and survivorship. AEL estimates the number of animals that would have survived to adulthood. FH estimates the loss of reproductive output of sexually mature females due to entrainment. Aquatic Biological Resources Table 3 summarizes the predicted impact of entrainment on target fish species based on six months of plankton data.

**AQUATIC BIOLOGICAL RESOURCES Table 3: Summary of Estimated Potrero PP Intake Entrainment for Abundant Fishes Based on Annual Probability of Mortality Due to Entrainment ( $P_m$ ), Fecundity Hindcast (FH) and Adult Equivalent Loss (AEL) Approaches Using Entrainment and Source Water Larval Concentrations January-June 2001**

<b>Taxa</b>	<b>Total Entrainment</b>	<b>2x FH</b>	<b>AEL</b>	<b><math>P_m^{(a)}</math></b>	<b><math>P_m^{(b)}</math></b>
Unidentified gobies	79,809,666	172,190	57,920	0.00166	0.00407
Yellowfin goby	63,758,085	7,984	*	0.00227	0.00403
Bay goby	47,716,465	*	222	0.00552	0.01116
Pacific herring	44,279,000	1,120	6,910	0.00406	0.02325
Northern anchovy	31,971,885	5,216	6,994	0.00124	0.00890
White croaker	6,869,074	154	*	0.00371	0.01975

\* Unavailable information or value that could not be computed (a)  $P_m$  values calculated using average period of entrainment risk, (b)  $P_m$  values calculated using maximum period of entrainment risk

These preliminary results indicate that hundreds of millions of fish larvae as well as fish eggs, invertebrate larvae, and other phytoplankton and zooplankton will be lost to the San Francisco Bay ecosystem because of entrainment in the Potrero PP cooling water system. These small planktonic organisms form the base of pelagic food chains in the bay. Because San Francisco Bay is a unique estuarine ecosystem that has been severely impacted by human activities, this loss in plankton is considered a significant adverse impact. For example, native aquatic species in San Francisco Bay have been devastated by opportunistic, non-native species such as the Asian clam and the European green crab. Because the intake will crop the larvae of native and non-native species indiscriminately, and because invasive species generally have the ability to out-compete native species, the loss of larvae will probably favor the continued invasion of non-native species. For example, within two years following its introduction, the Asian clam spread throughout San Francisco estuary where it reached densities in some areas of over 10,000 individuals per square meter (Carlton et al 1990). In addition, the NMFS has expressed concern about this loss of prey for juveniles of listed salmonids (NMFS 2001). CDFG also has expressed concern about the loss of entrained organisms to the marine food chains of San Francisco Bay (CDFG 2001).

However, the preliminary analysis of the effects of entrainment of larval fishes on fish populations in the bay suggests that entrainment would not result in the decline of any fish species. The analysis of six months of data indicates that losses of larval fishes to entrainment in the Potrero PP cooling are very small compared to populations in the source water. It should be noted, though, that populations of some species fluctuate in San Francisco Bay and there may be years when entrainment effects are greater than indicated in the analysis. In addition, in years when much of the herring spawning occurs in the vicinity of the Potrero PP, the portion of herring larvae lost to entrainment also may be greater than shown in Aquatic Biological Resources Table 3, above.

### **Cooling Water Discharge**

Impacts of the thermal effluent on biological resources may include changes in the abundance and distribution of sessile invertebrates and algae to favor species with a tolerance or preference for higher temperatures, avoidance of areas with elevated

temperature by mobile species sensitive to elevated temperatures, and effects on the development of herring eggs attached to structures within the thermal plume.

Elevated temperatures of the plant's existing shoreline discharge have been observed to be associated with noticeable changes in the species composition and abundance of intertidal and subtidal algae in the immediate vicinity of the discharge but have been observed to have little effect on invertebrates (SECAL 2000a, AFC page 8.2-16). Studies of fishes in the vicinity of the Potrero PP did not indicate that fishes avoided areas of elevated temperature nor did the study indicate that fishes were attracted to warmer temperatures (SECAL 2000a, AFC Appendix G pages 25 and 53).

Data from Pacific herring surveys showed that spawning occurred in the immediate area of the discharge (SECAL 2000b, AFC Supplement page 8.2-10). Herring eggs exposed to the warm plume water had shorter incubation periods and the length at hatching was shorter than those eggs and larvae collected from areas not contacted by the plume. It is possible that these smaller larvae may have a decreased chance of survival compared to the larger larvae that hatched in areas unaffected by the discharge.

The Unit 7 project would replace the existing Unit 3 shoreline discharge with offshore discharges through separate diffuser systems for both Unit 3 and 7. The present Unit 3 discharge raises ambient water temperatures by 2 degrees Fahrenheit (F) or more over an area that ranges from 10 to 150 acres and averages 55 acres (SECAL 2000a, AFC page 8.14-10). The existing discharge sometimes results in a temperature elevation at the shoreline that is 10 degrees F above ambient (SECAL 2000b, AFC Supplement Figures 8.2-4 through 8.2-6).

The relocation of the thermal discharge from Unit 3 to several hundred feet offshore as well as the use of a diffuser section should result in a greater dilution of the heated wastewater as well as a reduced chance of elevated temperatures at the shoreline. However, the Unit 7 discharge would be added to the Unit 3 discharge resulting in a total daily discharge volume of thermal effluent that may be as much as double that of the existing Unit 3 discharge. The applicant conducted a thermal analysis to predict the characteristics of the thermal plume for the Unit 3 and 7 discharges (MIRANT 2001 CoolingWater p. 7-16). That analysis is discussed in the **Soil and Water Resources** section of this FSA. Because of the interaction of the plumes from the different diffusers, which discharge into one another, the validity of the applicant's conclusion that the surface temperature rise will not exceed 4 degrees F is in doubt. The 4-degree F temperature rise would be expected to occur at and soon after slack tide. During other parts of the tidal cycle, when the ambient current is higher, induced temperature rises would be much smaller. Furthermore, the **Soil and Water Resources** section of this FSA concludes the 4-degree F temperature requirement could be achieved by a different configuration of the diffusers. Condition of Certification **Soil and Water-9** requires the applicant to conduct a scale model of the proposed outfall to verify that the surface temperature rise does not exceed 4 degrees F during and after slack tide periods.

As discussed in the **Soil and Water Resources** section of this FSA, temperature rises exceeding 4 degrees F would be limited to the individual discharge jets, which would not touch the sea floor. The volume of water where temperature rises exceeds 4 degrees F

is expected to be insignificantly small. The volume also would be highly discontinuous so that organisms are unlikely to become trapped in it. The only surfaces that would have elevated temperatures are the individual nozzles of the diffusers. Therefore, in spite of the increased discharge from the construction of Unit 7, the new outfalls would be expected to reduce the area affected by elevated temperatures compared to the existing condition. Herring may lay their eggs on the new discharge structures, but unless they lay eggs on the diffuser nozzles themselves, the eggs should not be exposed to temperatures of 4 degrees or more above ambient.

The three dimensional characteristics of the discharge plume are discussed in the **Soil and Water Resources** section in response to CDFG comment DFG-1. Temperature rises exceeding 4 degrees F would be limited to the area immediately above each diffuser port. An estimate of the maximum volume of water that would exceed 4 degrees F is 100,000 cubic feet. The elevated temperatures would be above each diffuser port and would not extend along the entire diffuser section. The temperature rise would be 20 degrees F for a distance of about 5 feet from each discharge port, decreasing to about 4 degrees F at the surface under worst case conditions. The volume of water at 20 degrees F above ambient would be about 300 cubic feet. Salmonids and other fish species sensitive to elevated temperatures would be exposed to these high temperatures for a brief period of time. Therefore, the amount of water with temperatures near lethal would be very small. The volume of water with a temperature rise above 4 degrees would also be small and discontinuous. Fish would be unlikely be exposed to elevated temperatures long enough to experience lethal thermal effects.

Because of the small amount of area that would experience elevated temperatures, discharges through the new outfalls are not expected to have a significant adverse impact on aquatic organisms. These preliminary conclusions about the new thermal discharges should be verified by the scale model required by Condition of Certification **Soil and Water-9** and also by actual sampling of the plume as will be required by the National Pollution Discharge Elimination System (NPDES) permit to be issued by the RWQCB (RWQCB 2001).

The NMFS has expressed concern about potential water column impacts of the proposed discharge to juveniles of listed salmonids (NMFS 2001). Juvenile salmonids are not strong swimmers and will move with the tide. While adult salmonids should be able to escape entrainment within the heated discharge plume with only short-term exposures, juvenile salmonids, which may be swept into the plume, may not be able to escape. The initial vertical velocity of the discharge is identified as 14 feet per second. Juvenile salmonids may be exposed to the effects of elevated water temperatures, and may be disoriented and pushed to the surface by the discharge plume. Disorientation and transport to the surface may result in increased exposure of juvenile salmonids to avian predators and larger fishes. The NMFS has expressed concern that the discharge has the potential to adversely affect listed salmonids and adversely affect the designated Critical Habitat of the threatened Central California Coast ESU of steelhead. Because the diffuser ports affect a small portion of the water column, impacts to juvenile steelhead and Chinook salmon would have a low probability of occurring. However, adverse impacts to listed salmonids or their Critical Habitat would be a significant adverse impact.



In addition, to the potential thermal impacts of heated wastewater and the potential physical effects of the discharge plumes, the cooling water discharge has the potential to impact aquatic organisms by discharging contaminants to the Bay. Sodium hypochlorite and sodium bisulfate are used to clean the intake and discharge structures (SEP2001Dresp3, Data Response No. 166). In accordance with the NPDES permit, no chlorine is discharged into the Bay. The applicant has presented data from seven sampling events at the intake and outfall that show no consistent pattern of higher concentrations of metals at the outfall compared to the intake (MIRANT2001Dresp5, Data Response No. 215). These data suggest that contaminants are not being added to the cooling water as it passes through the system. Differences in intake and outfall concentrations most likely reflect variability in surface water concentrations. Therefore, the proposed Unit 7 project is not expected to have adverse effects on aquatic organisms by increasing contaminants in San Francisco Bay nor is it expected to increase the body burdens of contaminants in fishes consumed by fisherman.

## **CUMULATIVE IMPACTS**

Section 15130 of the CEQA Guidelines requires a discussion of cumulative environmental impacts when they are determined to be potentially significant. Cumulative impacts are defined as those impacts that are created because of the combination of the project evaluated in conjunction with other projects causing similar impacts. The CEQA Guidelines require that the discussion reflect the severity of the impacts and the likelihood of their occurrence, but need not provide as much detail as the discussion of the impacts attributable to the proposed project alone.

The CEQA Guidelines also mandate two different ways in which cumulative impacts are to be evaluated. One of these mandated approaches is to summarize growth projections in an adopted General Plan or in a prior certified environmental document. The second method involves compilation of a list of past, present, and probable future projects producing related or cumulative impacts. The second method has been utilized for the purposes of this Final Staff Assessment.

The Unit 7 project would result in the permanent loss of approximately 0.24 acres of Bay habitat. The loss of Bay habitat would contribute to significant cumulative loss of habitat in San Francisco Bay. About 40 percent of the original surface area of the Bay has been diked off or filled since 1850 (BCDC 1999). To offset this cumulative loss of habitat both the Federal and State governments have adopted policies of no net loss of wetlands. To construct the new intake and outfall the applicant will be required to obtain a permit under Section 404 of the Clean Water Act. As a permit condition, compensatory mitigation in the form of habitat creation or restoration may be required to offset the loss of Bay habitat.

The Hunters Point Power Plant is located approximately 1.3 miles south of the Potrero PP. Aquatic organisms in the vicinity of these power plants are vulnerable to impingement and entrainment from the intakes of both facilities. In addition, there is the potential for cumulative impacts from the thermal plumes of both power plants' discharges. The Hunters Point Power Plant may be shut down before (or after) the Unit 7 project becomes operational. If the Hunters Point Power Plant is shut down, there no longer would be a cumulative impact to aquatic resources from the intakes and

discharges of two power plants in close proximity to each other. However, if Hunters Point continues to operate after the Unit 7 project comes on-line, there would be a cumulative impact on aquatic resources due to entrainment and impingement from the Hunters Point intake and the Potrero Units 3 and 7 intake.

Staff submitted a data request asking the applicant to describe the cumulative impact of the intakes of both power plants on aquatic resources (CEC2000Dreq3, Data Request No. 168). The applicant responded that because the 1971-1972 and 1989-1990 thermal effects studies were conducted while both plants were operating the results of those studies consider the impacts of both plants operating simultaneously (SEP2001DResp3, Data Response No. 168). Staff does not believe that this response or the previous studies adequately addressed the cumulative impacts of both intakes. Previous studies did not specifically analyze the impact of losses to both power plants on the populations of affected species. Furthermore, previous thermal effects studies were conducted over 10 years ago and need to be updated.

Information is not available on the extent of the elevated temperature plume from the Hunters Point Power Plant thermal discharge. However, the greatest extent of the thermal plumes from the Potrero PP and the Hunters Point Power Plant would occur during times of higher current speeds. During these periods the temperature rise is minimal. Therefore, the plumes would not be expected to interact to create an extended area of San Francisco Bay with elevated temperatures.

The dredging of approximately 0.4 acres in front of the new combined intake structure would add to the cumulative impacts of dredging disturbance in San Francisco Bay. Navigation channels and berths for large vessels in San Francisco Bay need to be dredged regularly to provide adequate depth for large vessels. This continual disturbance has probably facilitated the spread of exotic species and elimination of endemic species in San Francisco Bay. Although, the proposed dredging for the Unit 3 and Unit 7 intake would add to this significant cumulative impact, the amount of dredging is very small compared to the magnitude of other dredging projects in the Bay.

## **MITIGATION**

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### **APPLICANT'S PROPOSED MITIGATION MEASURES**

The applicant proposes to use cofferdams and silt curtains designed to minimize the dredging impacts on surface water quality during dredging and in-water construction (SECAL 2000a, AFC page 8-14-22). The applicant has stated it would monitor turbidity outside the silt curtains to verify that the devices were effectively containing turbidity and that it would implement remedial measures to reduce turbidity if turbidity outside the screens was found to exceed significantly ambient levels (MIRANT 2001 Dresp6, Data Response No. 195). The applicant also stated it would perform sediment testing and removal in accordance with Section 404 and Section 10 dredging permits (SECAL 2000a, AFC page 8.14-22).

The applicant has stated it would participate with the Energy Commission and other responsible agencies to determine appropriate enhancement measures to offset cooling

water intake structure and water withdrawal effects on the populations of aquatic organisms that may be affected by the cooling water intake (SECAL 2000a, AFC page 8.2-19). To this end, the applicant has had discussions with the Port of San Francisco regarding contributing money to the removal of derelict Pier 5 in the Pier 70 vicinity.

In response to a data request from the City and County of San Francisco (CCSF2000Dreq 1, Data Request No. 44), the applicant stated that if construction activities in the Bay occur within the herring spawning season of December through March, a qualified biologist would be retained (Mirant 2001, Dres CCSF, Data Response No. 44). If the biologist determines that construction activities have the potential to adversely affect spawning herring, the applicant stated that adjustments to construction techniques would be implemented.

## **STAFF'S PROPOSED MITIGATION MEASURES**

### **Construction**

Staff concurs with the applicant's plan to use cofferdams and silt curtains to minimize the impact of dredging and in-water construction on water quality. Staff recommends that sediment removal be performed in compliance with Section 10 and Section 404 permit requirements).

Based on input from CDFG (CDFG2001PSAComm), staff recommends that no dredging outside the confines of the cofferdam be done during the peak herring spawning season of December to March. Staff concurs with the applicant's proposal to hire a qualified biologist to be on site during herring spawning season to oversee construction and help minimize adverse effects on spawning herring. The biologist must be trained by CDFG to identify herring spawn and signs of spawning activity.

To avoid construction impacts on listed salmonids, the applicant will need to acquire a Biological Opinion from the NMFS, and implement any identified measures. Staff recommends that such measures, including suspension of in-water construction during sensitive migration periods, required by the NMFS to avoid impacts to salmonids be implemented by the applicant.

To avoid contamination of Bay waters from re-suspension of contaminated Islais Creek sediments during a frac-out, staff recommends that the applicant be required to develop a plan to contain sediments within Islais Creek.

### **Permanent Changes in Bay Habitat**

To offset permanent loss of Bay habitat from construction of the intake structure, staff recommends that the applicant be required to provide habitat compensation in the form of restoration or creation of Bay habitat as required under conditions set forth in the 404 permit issued by the USACE for the intake structure. Staff believes that the removal of artificial structures in central San Francisco Bay is appropriate mitigation for the placement of artificial structures in the Bay.

### **Impingement and Entrainment by the Cooling Water Intake**

Staff contends that following construction, an updated analysis of the project-specific and cumulative impacts of the combined Unit 3 and Unit 7 cooling water intake needs to

be completed. Staff recommends that the applicant complete a full year's study (ending in December 2001) of ichthyoplankton and crab larvae at the cooling water intake and in source water and use these data to analyze the impacts of entrainment on fish and crab populations. Staff also recommends that the applicant monitor impingement at the new intake structure for the period of a year. The applicant should use the data from these studies to determine the combined impact of impingement and entrainment at the intake on aquatic resources of San Francisco Bay. Unless the Hunters Point Power Plant has been decommissioned by the time the Unit 7 project begins operations, the analysis should specifically address the impact of impingement and entrainment at the Potrero PP and Hunters Point intakes.

As discussed in this FSA, preliminary analysis based on six months of plankton sampling data indicates that entrainment in the Potrero PP intake would crop a very small percentage of the plankton organisms in the source water and that no fish population would be likely to suffer a decrease as a result of this impact. However, San Francisco Bay is the largest estuarine system in California, a state that has few functional estuaries remaining. Moreover, San Francisco Bay has been greatly degraded, and considerable effort is being made to improve it. In that context, any losses of natural aquatic populations are significant. Staff believes that the applicant should be required to mitigate the entrainment and impingement effects such that there is an overall net improvement to the bay or at a minimum no net loss.

In consultation with the resource agencies (California Department of Fish and Game, Bay Conservation and Development Commission, and the National Marine Fisheries Service), staff has considered a variety of potential mitigation measures for the impacts of entrainment and impingement. These measures include the following:

- Creation or enhancement of eelgrass beds in Central San Francisco Bay. Eelgrass beds provide surfaces for the attachment of herring eggs and provide shelter for juvenile fishes and crabs. In addition, eelgrass beds are highly productive and would contribute to Bay productivity. Establishment of an eelgrass nursery also may be an appropriate means to aid eelgrass restoration efforts in San Francisco Bay. However, the potential success of eelgrass restoration in San Francisco Bay remains in doubt. Eelgrass restoration in San Francisco Bay has proved difficult.
- Creation of shallow water habitat by the removal of dikes and tidal inundation of diked wetlands. Additional shallow water habitat would increase the habitat available to species affected by entrainment and impingement. However, an available project of this nature has not been identified.
- Tidal wetlands restoration. Tidal wetlands support some of the species affected by impingement and entrainment at the Potrero PP intake. In addition, tidal wetlands are highly productive and would contribute to the productivity of the Bay. It remains unclear, however, to what extent restoration of tidal marshes would benefit open water populations in the bay.
- Implementation of a project to reduce the introduction of exotic species in ballast water. The introduction of exotic organisms via ballast water has devastated the natural communities of San Francisco Bay. Reduction in ballast water introduction of exotic species would help to restore the natural balance of the San Francisco Bay

ecosystem. However, no project that would successfully reduce the introduction of exotic species has been identified.

- Removal or reduction of an equivalent amount of water withdrawn from the central bay from another intake. Another intake that could feasibly be eliminated or improved in efficiency to reduce its withdrawal of bay water has not been identified.

It is not clear at this time that a feasible mitigation package can be developed to offset the impacts of impingement and entrainment from the new combined Unit 3 and Unit 7 intake.

## **COMPLIANCE WITH LAWS, ORDINANCES REGULATIONS AND STANDARDS**

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To comply with Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act, the applicant must obtain a dredging permit from the USACE of Engineers/DMMO prior to dredging. Construction of the new intake and outfall would also require Corps of Engineers Section 404 and Section 10 permits that must be obtained prior to construction. The USACE has indicated that the Section 404 permit for the intake and outfall falls under the conditions of Nationwide 7 for outfall structures (L. Fade, USACE, pers. communication, 2001).

Since Federal permits will be issued for this project, to comply with the Magnuson-Stevens Fishery Management and Conservation Act, as Amended, the USACE or the USEPA must consult the NMFS regarding the potential effects of these actions on Essential Fish Habitat. The USACE or the USEPA must also consult with the NMFS to determine whether a formal consultation under Section 7 of the Endangered Species Act is required to address potential impacts on listed salmonids. The NMFS has indicated that the project may affect listed salmonids (NMFS 2001). Therefore, formal Section 7 consultation is expected.

The USEPA has determined that Unit 7 would not be subject to the new final rule pursuant to 316(b) of the Clean Water Act addressing entrainment and impingement impacts from cooling water intake structures for new facilities (J. Mann, USEPA, personal communication 2002).

The new combined Unit 3 and Unit 7 intake would result in the reduction of fertility of native fish resources. Therefore, construction of the intake may be inconsistent with Section 66605(d) of the McAtteer-Petris Act.

## **UNRESOLVED ISSUES**

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The following issues are currently unresolved:

- The potential impacts to aquatic resources from exposure to contaminated creek sediments, and how they will be contained if there is a “frac-out” under Islais Creek during cable construction, needs to be better understood so staff can complete its analysis. The applicant needs to submit a plan to the CEC that describes the

equipment and procedures it would use to contain contaminated sediments in the event of a “frac-out”.

- Until the applicant proposes a mitigation package for the impacts of impingement and entrainment, staff cannot determine whether the impacts of the intake can be mitigated to insignificant levels.
- Combined impacts of entrainment at the Potrero PP intake and the Hunters Point Power Plant cannot be determined until the applicant either provides an analysis of those impacts or the CEC receives confirmation that the Hunters Point Power Plant will cease operating when Potrero Unit 7 comes on line.
- The applicant has not provided a Biological Assessment to either the USACE or the USEPA. This document must be provided to the federal agency that intends to initiate consultation with the NMFS. As of this Final Staff Analysis, staff believes that USEPA intends to initiate consultation with the NMFS. Once the applicant's Biological Assessment is provided to the NMFS, it must be reviewed and deemed data adequate by the NMFS. Once it is deemed data adequate, the NMFS has up to 135 days to provide a Biological Opinion regarding the project's compliance with the federal Endangered Species Act and the Magnuson-Stevens Fishery Management and Conservation Act (Essential Fish Habitat) consultation process.

## RESPONSE TO PUBLIC AND AGENCY COMMENTS ON THE PSA

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### CITY AND COUNTY OF SAN FRANCISCO (CCSF)

**CCSF-4A:** *“Intake Withdrawal and Thermal Discharge of Bay Water - The PSA does not adequately consider the implications of the intake and discharge dynamics upon circulation and thermal structure of the receiving water environment ...”*

**Response:** The effects of the cooling water system on Bay circulation are addressed in the **Soil and Water Resources** section of this FSA. The cooling water system is not expected to significantly modify circulation patterns. However, the entrainment of plankton in the cooling water system is expected to result in substantial losses of planktonic organisms. The applicant is currently studying the impacts of entrainment on larval fishes and crabs. A preliminary analysis of these losses is included in this FSA. A final analysis will be completed after a full year of study.

**CCSF-4B:** *“Entrainment and Impingement Effects Upon South Bay Populations – Localized single year sampling programs are in themselves inadequate in providing estimates for modeling efforts....inappropriate to conclude that entrainment losses have a low potential consequence to the species populations.”*

**Response:** Energy Commission staff recognizes that single year sampling programs may not reflect the temporal variability of aquatic resources. However, even multi-year programs may fail to adequately characterize resources. There are limits to the magnitude of studies it is reasonable to require. Previous studies that have been done on the aquatic resources of San Francisco Bay provide a context for the evaluation of

the data obtained in the single year study that is being done at the Potrero PP. Furthermore, single year studies with a similar design to that being performed at the Potrero PP have been done at other power plants and proved adequate to detect significant impacts.

The PSA did not conclude that entrainment losses have a low potential consequence to the species populations. That statement was in the AFC. Because of CEC staff's concerns about potential impacts of entrainment to the aquatic resources of San Francisco Bay, the applicant was requested to do additional studies to address those impacts.

**CCSF-4C:** *“Entrainment and Impingement Mortality Estimates. The PSA does not provide estimates of potential mortality of entrained organisms and impinged organisms from Unit 3 and the proposed Unit 7 combined operation.”*

**Response:** The FSA includes preliminary estimates of losses to entrainment based on six months of data. A final analysis will be completed after a year of sampling. Because the intake will be redesigned, impingement losses cannot be predicted accurately. The FSA does include information on the number of organisms impinged at the current Unit 3 intake. This number provides an extremely rough estimate of the magnitude of losses that may occur at the new intake. Impingement losses will be documented following construction of the new combined Unit 3 and Unit 7 intake.

**CCSF-4D:** *“Thermal Effects - Whereas the new discharge design dissipates the thermal load to comply with the Thermal Plan requirements (e.g. surface temperatures shall not exceed 4 degrees Fahrenheit above ambient), the actual thermal loading to the nearshore zone will be approximately doubled and average temperatures over an extended area will be significantly increased.”*

**Response:** This comment is addressed in the **Soil and Water Resources** section.

**CCSF-4E:** *“Sediment Boundary Layer Processes - Physical factors associated with the proposed Unit 7 construction and operation may alter the existing equilibrium dynamics of sediment deposition and re-suspension, potentially altering the consistency of sediment in the nearfield, with the possibility of mobilizing fine sediment from the seafloor and increasing turbidity within the water column [...] A second physical factor that will influence the normal flow of bottom water will be the emplacement of the discharge pipes, each 54” in diameter...”*

**Response:** This comment is addressed in the **Soil and Water Resources** section.

**CCSF-4F:** *“Condition of Sediments” – “The issue of sediment contamination is not adequately addressed in the PSA...”*

**Response:** Since the PSA was written, the applicant has provided additional information on contaminants in the sediments and has developed a plan to minimize impacts of construction in contaminated sediments. These measures are discussed in the FSA. They include relocating the intake to a less contaminated area than the originally proposed location, performing in-water construction within the confines of a

cofferdam or a silt curtain, and capping the area in front of the intake where dredging may expose sediments with high levels of PAH.

**CCSF-4G:** *“Altered Trophodynamics - There is also the possibility of an increase in flux of organic matter to the sediments resulting from the mortality and deposition of dead organisms that have passed through the cooling system. [...] Other marine outfall studies have noted the attractant properties of discharges to fish and macroinvertebrates that feed upon discharged organisms.”*

**Response:** This comment is addressed in the **Soil and Water Resources** section.

**CCSF-4H:** *“Cumulative Impacts – The PSA does not adequately treat potential cumulative impacts from other local and near-regional perturbations of the nearshore environment such as discharges from the Southeast Wastewater Treatment Plant (SWTP).”*

**Response:** The interaction between the SWTP and the Potrero PP outfall is addressed in the **Soil and Water Resources** section. If the Hunters Point Power Plant is still in operation when the Potrero Unit 7 comes on line, there will be a combined effect on aquatic resources because the intake of both power plants crop organisms from the same source water populations. Staff has requested information from the applicant on the additive effects of both power plants (CEC 2000 Dreq3, Data Request No. 168) but has not yet received a satisfactory analysis of the impacts of both intakes.

**CCSF-4I:** *“Marine Monitoring – The PSA does not adequately describe biological conditions in the receiving waters and sediments. Short-term monitoring to describe background conditions and potential biological resources at risk is not likely to provide an adequate assessment of potentially impacted populations....”*

**Response:** Staff has requested the applicant to conduct studies of impingement and entrainment effects using standard protocols developed with a great deal of scientific input for other power plants including Diablo Canyon, Moss Landing, and Morro Bay. Staff agrees that aquatic ecosystems are complex with a great deal of variability. However, the protocols used in the studies currently being performed by the applicant at the Potrero PP have proved adequate in detecting impacts at other power plants.

**CCSF-14A:** *“There is insufficient data or analysis to understand the water quality impacts of the proposed project...”*

**Response:** The applicant has supplied considerable additional data and analysis since the PSA was published, although information is still lacking on some issues. Staff has made a determined effort to coordinate amongst the different sections to address issues that require information from more than one discipline. Staff responsible for the Aquatic Biological Resources section have worked closely with staff responsible for the Soil and Water Resources section during production of this FSA.

**CCSF-14B:** *“Overall Summary – The discussion of water quality issues in the Aquatic biology section of the PSA appears to have been written independently of the Soil and Water section...”*



**Response:** Please see the response to CCSF-14A, above.

**CCSF-14C(i):** *“Modeling of thermal effects of the discharge of Unit 3 and the proposed Unit 7 is necessary to estimate environmental effects.”*

**Response:** The applicant presented information on thermal effects of the discharge based on modeling (MIRANT 2001 CoolingWater p. 7-16). The results of that analysis is evaluated independently in the **Soil and Water Resources** section of this FSA. The impacts of the thermal discharge on aquatic resources are evaluated in this section. Condition of Certification **Soil and Water-9** requires that preliminary conclusions about the behavior of the thermal plume be verified by a scale model.

**CCSF-14C(ii):** *“Impacts due to entrainment or impingement of biota- Larger biota will impinge on the screens intended to keep these organisms from being drawn into the cooling system...”*

**Response:** Although the new intake will be designed to reduce the loss of marine organisms due to impingement, it is expected that there will be some loss of organisms impinged on the new intake. These losses are difficult to quantify until the new intake is installed. The FSA provides information on the number of organisms impinged at the existing intake. This number provides a very rough estimate of the level of impingement that might be expected at the new intake. The FSA provides a preliminary analysis of the loss of fish larvae expected from entrainment in the new combined cooling water system. For the purposes of this analysis, it was assumed that all entrained organisms would die.

**CCSF-14C(iv):** *“The PSA does not address cross-media issues such as dioxin generation and fallout or water quality implications from other air pollutants...”*

**Response:** Air emissions from the Unit 7 project would not be expected to add substantial amounts of dioxins to the waters of San Francisco Bay.

**CCSF-14D(i):** *“Aquatic Biology and Soil and Water Resources: Section Coordination.”*

**Response:** Please see the response to CCSF-14A, above.

**CCSF-14D(ii):** *“On going thermal impacts.”*

**Response:** Impacts to aquatic resources of the new outfall systems are evaluated in this FSA.

**CCSF-14D(iii):** *“Impingement – effects of finer mesh screen at the intake...”*

**Response:** Studies have found that finer mesh screens reduce entrainment, and, with a fish return system to reduce impingement losses, may result in an overall lower loss of organisms than larger mesh screens (EPA 2001a).

**CCSF-14D(iv):** *“Entrainment Impacts – Entrainment impacts are not addressed in adequate detail....”*

**Response:** The FSA includes an analysis of entrainment impacts at the new intake based on surveys conducted between January and June 2001. The analysis assumed 100 percent mortality of organisms entrained in the intake.

**CCSF-14D(v):** *“Species Identification – Because entrainment identifications may be difficult, the PSA should use identifications to family or higher level when evaluating impacts to commercially important species...”*

**Response:** The entrainment analysis did address impacts at the family level for taxa (such as gobies) that are difficult to identify.

**CCSF-14D(vii):** *“Post-construction studies of entrainment impacts....The PSA indicates the project will conduct a full year of ichthyoplankton entrainment studies but does not mention zooplankton entrainment, which also must be evaluated..”*

**Response:** The entrainment study includes an evaluation of impacts to crab larvae.

**CCSF-14D(viii):** *“Post-construction studies of impingement impacts – The PSA indicates that fish impingement will be monitored monthly but does not mention invertebrate impingement which is also important...”*

**Response:** The impingement study will document impingement of invertebrates.

**CCSF-14D(ix):** *“The procedures used for the chemical treatment of the intake structures to minimize fouling (sodium hypochlorite and sodium thiosulfate) are not adequately described...”*

**Response:** Potential contaminant impacts to aquatic resources are addressed in this FSA. No chlorine is discharged to the bay, and, therefore, no impacts to aquatic resources would be expected.

**CCSF-14D(xvi):** *“Technical or interpretation errors in the PSA.”*

**Response:** The FSA corrects the errors pointed out in the PSA.

**CCSF-14E(i):** *“Construction impacts on fisheries - ...A more protective approach for the herring fishery which should be considered and discussed in the PSA would be to suspend in-water construction during the spawning season (December-March).”*

**Response:** Staff recommends that no dredging outside the confines of the cofferdam be done during the peak herring spawning season of December to March.

**CCSF-14E(ii):** *“Loss of bay habitat-...The PSA needs to refer to controls, including oversight that will ensure that the compensatory mitigation actually performs as intended and provides the required mitigation.”*

**Response:** Staff concurs that any compensatory mitigation package should include performance criteria and a monitoring program to insure that required mitigation functions as intended.

**CCSF-14E(iii):** “Impingement mitigation (maintenance and net replacement)...”

**Response:** The applicant will be required to monitor impingement for a year following project construction to insure that the new intake does not impinge significant numbers of organisms. If impingement is significant, the applicant will be required to mitigate. Preferred mitigation would be to implement measures (such as redesign of the screen or an improved fish return system) that would reduce impingement losses to insignificant.

**CCSF-14E(iv):** *“Heat treatment - ....Heat treatment should be suspended during Pacific herring spawning season and known migration movement of other species.”*

**Response:** As discussed in the **Soil and Water Resources** section, the applicant is reportedly developing a means of mixing the recirculated water slug with flow from the other unit to minimize discharge temperatures during heat treatment. A Condition of Certification is included (**Soil & Water-10**) that will require this procedure to be developed before construction can start.

## **CALIFORNIA DEPARTMENT OF FISH AND GAME (CDFG)**

**CDFG-1:** *“Thermal Impacts. Thermal increases greater than 4°F at the Bay floor or in any part of the water column should be considered as a potential significant impact given the numerous invertebrate and fin fish which utilize the proposed project site. Furthermore, due to the adhesive nature of spawned Pacific herring eggs which will likely occur on substrates adjacent to and including the outfall structure, the potential for impact to this species particularly needs to be addressed.”*

**Response:** This comment is addressed in the **Soils and Water Resources** section.

**CDFG-2:** *“Contaminated sediments...a complete report of the sediment test results was not available in the PSA. The Final Staff Assessment (FSA) should incorporate the results of the sediment testing.”*

**Response:** The results of the most recent sediment testing are incorporated into the Soils and Water Resources section. Based on those results the applicant changed its construction plan and relocated the new intake structure to an area with lower concentrations of PAHs. The potential impacts to aquatic resources of the current in-water construction plan are analyzed in the Aquatic Biological Resources section of the FSA.

**CDFG-3:** *“Contaminated sediments -...The FSA should discuss the maintenance dredging requirement at the intake and determine if the depth of the sediment testing will encompass the depth of the scouring should that occur.”*

**Response:** It is anticipated that maintenance dredging at the intake will not be necessary.

**CDFG-4:** *“Bay fill -...The total amount of fill needed for the intake and outfall structures needs to be provided so that adequate mitigation can be determined by the resource agencies.”*

**Response:** The construction of the intake structure will result in the permanent loss of approximately 0.24 acres of Bay. Construction of the outfall structures will replace approximately 3.2 acres of soft bottom habitat with artificial hard bottom habitat.

**CDFG-5:** *“Impingement and entrainment-....”The Department believes that the PSA does not provide for adequate data analysis on the number of organisms potentially lost due to entrainment. The Department recommends that these data be analyzed with methods that are currently employed at other power plants regulated by the CEC, such as Proportional Entrainment, Adult Equivalent Loss, Fecundity Hindcast, and the Empirical Transport Model. The results from these analyses can then be used by the CEC, the applicant, the Department, and others to more accurately estimate conditional mortality due to entrainment.”*

**Response:** The FSA includes a preliminary analysis of entrainment impacts using Proportional Entrainment (Empirical Transport Model), Adult Equivalent Loss, and Fecundity Hindcast. Plankton sampling will continue through December 2001. A final analysis of entrainment impacts will be done using a full year of data. Impingement will be documented monthly for one year following construction of the new intake. A final report will be prepared that analyses intake losses of both entrainment and impingement.

**CDFG-6:** *“Furthermore, the Department recommends that all entrainment and impingement losses be estimated before (i.e., baseline) and after (i.e., monitoring) construction of the new intake system to more accurately measure adverse impacts.”*

**Response:** See response to CDFG-5 above.

**CDFG-7:** *“Impingement and entrainment-...While the Department concurs that a monetary contribution designated for habitat restoration could address the loss of fish and crab resources to impingement and entrainment, it will be necessary for State, federal, and local agencies to be involved in the discussion and decision making process regarding this form of mitigation.”*

**Response:** State, federal, and local agencies will be involved in the discussion and decision making process regarding mitigation for all significant impacts to aquatic resources.

**CDFG-8:** *“The Department believes that the FSA should include other possible options in addition to monetary contributions. Additionally, the FSA should discuss possible mitigation options for other project related impacts such as Bay fill and the effects of the thermal plume.”*

**Response:** This FSA includes a discussion of potential mitigation measures, but at this point an adequate mitigation package for impacts of the once-through cooling system to

aquatic resources has not been identified. Therefore, staff is recommending an upland cooling system be used for the Unit 7 project.

**CDFG-9:** *“Impingement and entrainment- The Department also recommends to the CEC that alternatives to increasing the size of the cooling water intake be strongly considered...”*

**Response:** This FSA includes an analysis of alternatives to the once-through cooling system.

**CDFG-10:** *“Cumulative impacts – The PSA does not adequately discuss the potential cumulative impacts from both the Hunter’s Point Power Plant and the Potrero Power Plant operating simultaneously.”*

**Response:** If the Hunters Point Power Plant is still in operation when the Potrero Unit 7 comes on line, there will be a cumulative effect on aquatic resources because the intake of both power plants crop organisms from the same source water populations. Staff has requested information from the applicant on the cumulative effects of both power plants (CEC 2000 DReq3, Data Request No. 168), but has not yet received a satisfactory analysis of the impacts of both intakes.

**CDFG-11:** *“Construction – Silt curtains used during the construction of the intake must be properly maintained to ensure their effectiveness in protecting marine resources from excessive turbidity, as well as contaminated dredged material.”*

**Response:** The applicant has specified that turbidity outside the silt curtain would be monitored and remedial actions taken if turbidity significantly above ambient were detected (MIRANT 2001 Dresp5 Data Response No. 195).

**CDFG-12:** *“Construction.... dredging during the peak herring spawning season (December to March) must be done with a cofferdam. No dredging outside of a cofferdam should be permitted during that time period.... It is critically important that the Department have the opportunity to train the designated biologist on identifying herring spawn and signs of spawning activity.”*

**Response:** Staff recommends that these measures be incorporated into the project.

**CDFG-13:** *“Cooling water intake system – The PSA states that after completing the dredging required to construct the new intake, that benthic organisms will re-colonize the dredged footprint. While this is likely to be the case, it should be discussed in the PSA that the biological diversity of benthic organisms at the site would also likely be reduced due to opportunistic species colonizing the disturbed site.”*

**Response:** The FSA states that the dredging is likely to lead to at least a temporary decrease in species diversity within the dredge footprint.

**CDFG-14:** *“...Proper maintenance of silt curtains must be ensured and outlined in the FSA.”*

**Response:** Please see response to CDFG-11, above.

**CDFG-15:** *“...Islais Creek sediments are known to contain contaminants and a plan should be in place in the FSA.”*

**Response:** The applicant has not yet submitted a plan to contain sediments in case of a frac-out during boring under Islais Creek. Staff recommends the applicant prepare such a plan.

**CDFG-16:** *“Marine habitats - ...elasmobranch species (e.g. sharks and rays), including leopard, soupfin, smoothhound, and seven gill shark, which are likely present in this portion of San Francisco Bay, are not discussed.”*

**Response:** The FSA includes a discussion of sharks and rays that may occur in the project area. Additional surveys for elasmobranchs are not recommended at this time. Staff recommends that impingement at the new intake be monitored after project construction. The monitoring will document impingement of elasmobranchs as well as other fish and invertebrate species.

**CDFG-17:** *“Marine habitats – The PSA states that some Dungeness crab found in trawl surveys conducted by Mirant ranged in size from 37 to 160 millimeters (mm) and at that size range were recruited into the sport fishery. Actually, Dungeness crab are not recruited to the sport fishery until they range from 146 to 152 mm in size.”*

**Response:** The discussion of Dungeness crabs in the FSA has been revised to clarify the relationship between size and recruitment into the fishery.

**CDFG-18:** *“Marine habitats – It is important to include in the discussion on Pacific herring that herring are not only an important commercial species, but also a very important forage fish for a variety of marine species.”*

**Response:** Information on the importance of Pacific herring as a forage fish has been included in the FSA.

**CDFG-19:** *“In addition, it should also be clarified in the PSA that herring eggs are adhesive and not free floating, thus making them extremely vulnerable to local environmental impacts.”*

**Response:** The FSA includes a statement that herring eggs are adhesive.

**CDFG-20:** *“Marine habitats - .... It is important to clarify in the PSA that spawning events in recent years have consistently occurred in the vicinity of the Potrero Power Plant.”*

**Response:** The discussion of herring spawning has been revised in the FSA to clarify that recent spawning has occurred near the Potrero PP.

## **SAN FRANCISCO BAY REGIONAL WATER QUALITY CONTROL BOARD (RWQCB)**

**RWQCB-1:** *“Due to the absence of real time monitoring data, the environmental impacts of the new cooling water discharges cannot be fully characterized. The draft NPDES permit includes provisions requiring Mirant to collect intake and effluent chemical data, conduct a dioxin special study...”*

**Response:** Condition of Certification **Soil & Water 3** requires the applicant to comply with all the provisions of the NPDES permit.

## **NATIONAL MARINE FISHERIES SERVICE (NMFS)**

**NMFS-1:** *“Construction of the cooling water system intake ....Studies are cited that show that recovery can occur within 2-3 weeks after dredging stops. These studies may not accurately characterize what would happen in this area of San Francisco Bay...San Francisco Bay is extensively invaded with non-native species, and disturbed or altered environments are thought by some to be more easily invaded.”*

**Response:** The discussion has been revised in the FSA to base recovery on a reference for San Francisco Bay and to indicate that disturbance may provide an opportunity for the invasion of exotic species.

**NMFS-2:** *“Turbidity – Long-term suspended sediment from seepage from the project area could occur and should still be considered for turbidity effects and contaminated effects beyond the work area.”*

**Response:** Excavation of the most contaminated sediments would be done within a cofferdam to prevent seepage. Construction beyond the cofferdam would be done within a silt curtain. The applicant has specified that turbidity outside the silt curtain would be monitored and remedial actions taken if turbidity significantly above ambient were detected (MIRANT 2001 Dresp5, Data Response No. 195). With these measures effects of turbidity and contaminants beyond the silt curtain would not be expected.

**NMFS-3:** *“Noise -...Noise and vibration from pile-driving activities should be better characterized, and potential adverse effects should be determined by species predominately found in the project area, before the impacts can be determined to be insignificant.”*

**Response:** The results of a study on the effects of pile driving to juvenile salmonids has been added to the discussion. The determination of insignificance was based on reviewed studies that indicated temporary behavioral responses and on the fact that pile driving will occur only to install the cofferdam, which would be expected to take no more than a few days. However, the FSA does specify that any interruption in the migration patterns of listed salmonids would be a significant adverse impact. Staff has recommended that the applicant consult with NMFS prior to construction and implement any measures specified by NMFS to protect salmonids from adverse impacts during construction.

**NMFS-4:** “Contaminants...As mentioned previously, silt curtains are not 100 percent effective, especially under tidal conditions, and only help to minimize impacts outside the work area.”

**Response:** Please see the response to NMFS-2, above.

**NMFS-5:** *“Concentrations of copper and nickel in discharge water -...the discharge containing elevated levels of copper and nickel should be considered to be harmful to aquatic organisms.”*

**Response:** The applicant supplied additional data from seven sampling events at the intake and outfall that show no consistent pattern of higher concentrations of metals at the outfall compared to the intake (MIRANT 2001 Dresp5, Data Response No. 215). These data suggest that contaminants are not being added to the cooling water as it passes through the system. Differences in intake and outfall concentrations most likely reflect variability in surface water concentrations. Therefore, the proposed Unit 7 project is not expected to have adverse effects on aquatic organisms by increasing contaminants in San Francisco Bay.

**NMFS-6:** “Hunters Point Power Plant cumulative impacts – The applicant’s response of citing the 1971-72 and 1989-90 thermal effects studies does not address cumulative impacts of both plants operating simultaneously for the reasons stated in the PSA, but also because those studies did not analyze impacts with the proposed additional Unit 7 operating as well.”

**Response:** Staff agrees with this comment.

**NMFS-7:** *“Mitigation for habitat - ...There may be limited opportunity in San Francisco Bay to provide appropriate enhancement measures that will benefit the species impacted. It is possible that any enhancement or restoration effort may not be successful, or may facilitate colonization of non-native species without benefit to the impacted species or even be detrimental. Any enhancement or restoration measures to be implemented should be developed prior to approval of the project, so that the appropriateness can be determined before impacts occur.”*

**Response:** Mitigation for Bay fill will be developed prior to project construction, because it will be a requirement of the permit that will be issued under Section 404 of the Clean Water Act. The applicant has not yet identified a mitigation package acceptable to staff that would reduce the impacts of entrainment and impingement to insignificant. Therefore, staff is recommending that an upland alternative to once-through cooling be implemented for the Unit 7 project.

**NMFS-8:** “Mitigation for entrainment and impingement effects -...First, the impacts are losses in numbers of organisms and a habitat restoration project may not be appropriate to increase the population of impacted organisms enough to compensate for losses. Secondly, there may not be an appropriate aquatic habitat restoration project that will provide adequate onsite mitigation for impacts. CEC staff should consider other options for mitigation, in the event that an appropriate aquatic habitat restoration project is not available and/or after monitoring is found to be not successful.”



**Response:** Because of concerns by staff and the resource agencies that adequate mitigation for entrainment and impingement impacts may not be available, staff recommends an upland alternative to once-through cooling be implemented for the Unit 7 project.

**NMFS-9:** *“The CEC should analyze and incorporate alternative cooling technologies as a mitigation option for losses due to entrainment and impingement.”*

**Response:** An analysis of alternative cooling technologies is included in this FSA. Because it is unclear whether the impacts of impingement and entrainment can be mitigated to insignificant, staff recommends an upland alternative to once-through cooling for the Unit 7 project.

**NMFS-10:** *“Clarification of significant adverse impacts – If one looks at sustainability as the threshold for significance, commercial fish species are still impacted and commercial and recreational fisheries will suffer as they will not be able to harvest what would normally be available. Non-commercial species are important as prey or in other roles in the ecosystem of the Bay, and any reduction in their populations can indirectly affect listed, commercial and recreational species. Any reduction in populations of native species could also provide more opportunities for non-native species. Determination of significance should be made with consideration of all these impacts.”*

**Response:** The impact analysis considered impacts to all species not just species of commercial and recreational importance. Analysis of entrainment impacts considered impacts to all species entrained in substantial numbers. Although the preliminary analysis did not indicate that entrainment would cause a reduction in the population of any species, the overall loss of Bay productivity and degradation of the unique aquatic ecosystem of the bay were considered significant impacts.

**NMFS-11:** *“The alternative cooling systems discussion has very little analysis of the benefits and how they relate to costs.”*

**Response:** An analysis of alternative cooling technologies is included in this FSA.

**NMFS-12:** *“A complete cost-benefit analysis should be provided for the various cooling alternatives prior to approval of the project to confirm that the best option is selected.”*

**Response:** An analysis of alternative cooling technologies is included in this FSA.

## **SAN FRANCISCO BAY CONSERVATION AND DEVELOPMENT COMMISSION (BCDC)**

**BCDC-9:** *“Section 66605 (d) of the McAteer-Petris Act needs to be addressed in the Aquatic Biological Resources section.”*

**Response:** A discussion of Section 66605 (d) of the McAteer-Petris Act is included in this section of the FSA.

## **GOLDEN GATE AUDUBON SOCIETY (AUD)**

**AUD-1:** *“Your analysis should investigate the following potential impacts and we hope provide either a denial of the project or a redesign of the project substantial enough to reduce these impacts. We do not believe that mitigation through habitat restoration will sufficiently mitigate the project’s impacts.”*

**Response:** Because a suitable mitigation package that will reduce the impacts of entrainment to insignificant has not been identified by the applicant, staff is recommending an upland alternative to the once-through cooling system be implemented.

**AUD-2:** *“Five hundred thousand acre-feet of water will be pumped and heated every year. It may have impacts that need to be analyzed.”*

**Response:** The impacts of water withdrawal on the circulation patterns of the bay are addressed in the **Soil and Water Resources** section in response to comment CCSF-4A. Although the amount of water withdrawn would be large, it is a very small fraction of the tidal prism of the bay and would not significantly affect circulation patterns.

**AUD-3:** *“Impacts to the base of the food chain, i.e. phyto and zooplankton.”*

**Response:** In analyzing the impacts of entrainment, the FSA assumed that all entrained organisms would be killed. A preliminary analysis of entrainment impacts based on 6 months of sampling is provided in the FSA. The preliminary analysis suggests that entrainment will not result directly in the decline of any species in San Francisco Bay. However, the loss of so many planktonic organisms through entrainment is considered a significant adverse impact because it represents a long term loss of organisms to a unique estuarine ecosystem.

**AUD-4:** *“...Will the non-natural significant increase in Bay water temperatures resulting from this project impact this local Dungeness crab population?”*

**Response:** The heated water will be discharged through diffuser ports angled upward. Warm water is less dense than cold water and rises. The warmed water will mix rapidly with the colder water of the Bay. The discharge will not result in an increase in bottom temperatures. Therefore, the discharge is not expected to have an adverse impact on Dungeness crab.

**AUD-5:** *“What will be the impacts of impingement?”*

**Response:** Because the new intake will have a different design than the existing intake, it is difficult to predict the impacts of impingement. Therefore, staff recommends that the applicant monitor impingement at the new intake for one year following the beginning of operation of Unit 7. Shouldn't you state that staff recommends that the project utilize another cooling technology other than once-through cooling?

**AUD-6:** *“What are the hydrologic impacts to the Bay from having so large an amount of water being sucked out every day?”*

**Response:** This comment is addressed in the **Soil and Water Resources** section in response to comment CCSF-4A.

**AUD-7:** *“Can the curtain contain all contaminants? What about work outside the silt curtain for the water pipe for the intake and outfall of the water used for cooling, for example?”*

**Response:** The most highly contaminated sediments will be excavated within a cofferdam and there will be no potential for these contaminants to be distributed outside the construction area. For dredging within the silt curtain, containment of contaminants is expected to be effective as long as the silt curtain is maintained properly. Construction of the outfall outside the silt curtain will consist primarily of placement of the structures on the sea floor. Re-suspension of sediments during these activities would be minimal and contaminant concentrations in these locations are not elevated.

**AUD-8:** *“You need to analyze the cumulative impacts that will result from other projects such as the Port of Oakland’s 50-foot dredging project, the San Francisco Airport’s proposal to use a borrow pit relatively close to this project and the possible contaminants released from activities at Hunters Point.”*

**Response:** A discussion of the cumulative impacts of other dredging projects has been added to the Cumulative Impacts portion of this FSA. The Potrero PP Unit 7 project is not expected to contribute contaminants to San Francisco Bay. Therefore, this project will not add to the cumulative impacts of contaminants in the Bay.

**AUD-9:** *“Mitigation – We urge you to require in-kind mitigation for this project...Evidently, BCDC has suggested that the removal of piers from the San Francisco shoreline may mitigate for the project impacts. We question whether removing these piers will provide adequate mitigation...”*

**Response:** Please see response to **AUD-1**. Removal of piers would be appropriate mitigation for some of the project impacts. Construction of the new intake structure would fill bay waters and the new outfall structures would replace natural bay bottom with artificial structures. Removal of piers would restore open water and natural bay soft bottom habitat. The restoration of soft bottom would provide habitat for Dungeness crab. It is anticipated that additional types of mitigation would be required to offset the impacts of entrainment and impingement. Because adequate mitigation for entrainment and impingement has not been identified, staff has recommended that an upland alternative to once-through cooling be implemented.

**AUD-11:** *“...airborne pollutants also enter our aquatic food chain as they are wind-deposited into the Bay. This plant will therefore have impacts on those who depend on near shore fisheries for subsistence living. You should analyze the potential health impacts from these airborne particulates, the impacts to fisheries from airborne contaminants released from the plant that settle into the Bay and the health impacts to fisherpeople who consume those fish.”*

**Response:** Please see response provided in the **Public Health** section.

## SAN FRANCISCO BAYKEEPER (SFBK)

**SFBK-1B:** *“Neither staff nor the applicant has completed an evaluation of ecological risk posed by disturbing contaminated sediments resulting from dredging. PSA at 4.14-29. Please explain how the project’s environmental impact can be evaluated without this essential information.”*

**Response:** The potential impacts to aquatic species from the disturbance of contaminated sediments during intake and outfall construction are discussed in this FSA. Based on characterization of contaminants in the sediments, the applicant relocated the new intake to an area with lower PAH concentrations to reduce the removal and exposure of contaminated sediment. Excavation of the most contaminated sediments will be done within a cofferdam to prevent exposure of aquatic organisms to contaminants. Construction beyond the cofferdam will be done within a silt curtain. With these measures in place, aquatic organisms will not be exposed to contaminated sediments.

**SFBK-1C:** *“Staff notes that the applicant’s data assessing impacts to fish are woefully outdated. Astonishingly, rather than require updated studies, staff proposes that this essential information be collected after project certification...Please explain how the public and other agencies can evaluate the project impacts without this essential information.”*

**Response:** To fill the identified data gaps, the applicant initiated monthly marine biological studies at the Potrero PP in January 2001. The results of these studies through November 2001 have been docketed. In addition, the applicant has provided a preliminary analysis of entrainment impacts based on six months worth of data. This study has also been docketed. The information from these recent marine biological studies is included in this FSA. Impacts of impingement cannot be determined prior to construction of the new intake because the new intake will have a design that is completely different than the existing intake.

**SFBK-2B:** *“By proposing unspecified sums of money for unspecified projects, such mitigation defies evaluation by the public and by public agencies. What is the monetary value of the Bay’s last steelhead? How will compensation by Mirant mitigate the destruction of any of these last remaining species? Please explain how the proposed mitigation complies with CEQA. The proposal to require the applicant to pay compensation as a form of mitigation adds insult to injury. Not only is there no evidence provided that such compensation will do anything to lessen impact to aquatic organisms and habitat, but the concept presupposes that the impact cannot itself be eliminated – a supposition which is confounded by the PSA’s own observations that alternative cooling, technologies, such as dry cooling, may eliminate massive intake flows and thermal discharges altogether...”*

**Response:** Because a mitigation plan that would reduce the impacts of entrainment to insignificant has not been identified, staff has recommended an upland alternative to once-through cooling be implemented.

## **JACKIE WILLIAMS – LANDOWNER AND RESIDENT OF SOUTH SAN FRANCISCO (JW)**

**JW-5:** *“How will food chain be affected? Is there a threshold, such as 5%, for the whole Bay? What will be the cumulative effects with other power plants and the proposed SF Airport runway expansion?”*

**Response:** The loss of small planktonic organisms to entrainment in the cooling water system represents a loss to the pelagic food chains of the Bay. Preliminary analysis indicates that this loss represents a small percentage (less than 5 percent) of the populations of planktonic organisms in the source water. Nevertheless, because San Francisco Bay is a unique and fragile estuarine system, the FSA identifies this loss as a significant adverse impact. The loss of Bay habitat and water volume from construction of the intake will act cumulatively with the loss of habitat and water volume from other proposed fills in San Francisco Bay. Compared to projects such as the airport expansion, the loss of habitat from intake construction is small. However, because of the extensive cumulative losses of Bay habitat in San Francisco Bay during the last hundred years, the FSA identifies the impact as significant.

## **CONCLUSIONS AND RECOMMENDATIONS**

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### **CONCLUSIONS**

Staff has concluded that permanent loss of Bay habitat from construction of the cooling water intake, and impingement and entrainment from the intake of Bay water for the cooling water system may be significant at both the project-specific and cumulative levels. Staff expects that with sufficient mitigation/compensation the impacts of Bay fill can be mitigated to a less than significant level. Removal of an appropriate area of existing artificial structures would compensate for the fill of 0.24 acres of Bay habitat. Removal of Pier 5 in the Pier 70 vicinity is likely to provide at least partial mitigation for Bay fill impacts.

The applicant has not proposed mitigation for the loss of planktonic organisms due to entrainment at the intake. It is not clear that, even with mitigation, these impacts can be mitigated to insignificant.

An alternative cooling system that does not rely on the intake of water from San Francisco Bay would eliminate all of the impacts to aquatic organisms from the Unit 7 project. Staff is concerned that the cropping of hundreds of millions of aquatic organisms by entrainment and impingement at the intake may have long-term impacts on the aquatic ecosystem of San Francisco Bay. San Francisco Bay, the largest estuary in the western United States, is a unique environment that has been severely impacted by human activities. Therefore, to avoid further impacts that may have implications that are impossible to predict, staff recommends that the proposed project be required to employ an alternative cooling technology.

## **RECOMMENDATIONS**

To avoid significant impacts to the unique aquatic ecosystem of San Francisco Bay, staff recommends that the Unit 7 project employ an alternative cooling system that does not withdraw water from the bay.

Staff recommends that the applicant submit a plan describing how it would contain contaminated sediments in the event of a “frac-out” when boring under Islais Creek.

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**APPENDIX TO BIOLOGICAL RESOURCES  
POTRERO POWER PLANT COOLING OPTIONS**



# POTRERO POWER PLANT COOLING OPTIONS

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# **APPENDIX TO BIOLOGICAL RESOURCES POTRERO POWER PLANT COOLING OPTIONS**

Testimony of Susan V. Lee and James C. Henneforth

## **1 INTRODUCTION**

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### **PURPOSE OF REPORT**

The proposed once-through cooling system for the Potrero Unit 7 Project (Unit 7) would use large quantities of water, pulling cool water from the San Francisco Bay and returning almost all of the water, warmed, to the Bay. This analysis of cooling options at Potrero was undertaken for two reasons. First, this Final Staff Assessment (FSA) for the Unit 7 project identifies potential impacts to aquatic biological resources that would result from the proposed use of once-through cooling. Second, the McAteer-Petris Act, which governs actions of the Bay Conservation and Development Commission (BCDC), requires that an analysis of feasible alternatives be considered prior to taking action on the proposed project which requires construction of a new intake and outfall structure in the Bay, resulting in filling of additional baylands. Options being considered by BCDC include dry cooling and hybrid cooling. Therefore, this report will support both the Energy Commission's impact analysis under CEQA and the BCDC's consideration of the project's compliance with the McAteer-Petris Act.

This report analyzes the potential impacts of two cooling technologies: a dry cooling system and a hybrid (wet/dry) cooling system. The dry cooling system utilizes air-cooled condensers (ACCs) to cool turbine exhaust, and the hybrid system (also called a parallel condensing wet/dry system) uses water for cooling and as well as ACCs.

A 100% wet cooling system is not considered because, although sufficient water is available from the City's Southeast Water Treatment Plant, use of wet cooling without plume abatement (which is included in the hybrid design) would create frequent visible vapor plumes given the climate conditions in San Francisco. The advantage of wet cooling over hybrid cooling is that the wet cooling towers would be somewhat shorter, but with vapor plumes frequently visible above the towers, this visual advantage would be lost. Wet cooling towers are also about 30% less expensive than hybrid towers. But in all other aspects, wet towers and hybrid towers are the same.

### **SUMMARY OF CONCLUSIONS**

The disciplines in which potential impacts from dry and hybrid cooling technologies are of most concern are air quality, noise, visual resources, land use, and power plant efficiency. For both air quality and noise, impacts of dry and hybrid cooling would be greater than those of once-through cooling, but mitigation is feasible and available to reduce impacts to less than significant levels. Visual impacts of the hybrid cooling system would not be significant, but impacts of the dry cooling equipment would be significant and unmitigable from several viewpoints. As a result of the visual impacts, dry cooling would also create land use incompatibility.

Dry and hybrid cooling technologies are less efficient than once-through cooling in cooling steam, so power generation is slightly reduced using these technologies. Also, additional electricity is required to operate the cooling fans, so net power generation is reduced for that reason as well. These reductions in efficiency are found to be small (2.5% for dry cooling and 1% for hybrid cooling), and they are determined not to cause significant adverse impacts on the availability of fuel or to cause wasteful or inefficient energy consumption.

## **REPORT CONTENTS**

This report includes six chapters that include the information shown below.

### **1. Introduction**

Chapter 1 describes the purpose of the report, the cooling options that are reviewed in this report, report contents, the roles of the Energy Commission and the BCDC, and a brief description of the aquatic biology impacts of concern.

### **2. Background on Cooling Options**

Chapter 2 provides an overview review of the cooling technologies considered in this report: (dry cooling and hybrid cooling). It describes the basic technologies and how they work, where the technologies are currently used, and the advantages and disadvantages of each.

### **3. Conceptual Design of Cooling Options for Potrero Power Plant**

Chapter 3 presents specific designs for cooling options to replace or enhance the once-through cooling system proposed by Mirant. This Chapter presents two possible locations for a dry cooling system and one for a hybrid cooling system.

### **4. Environmental Analysis of Cooling Options**

Chapter 4 analyzes the environmental effects of the cooling options and the alternative locations for each of the issue areas that would be substantially affected (e.g., air quality, aquatic biology, visual, etc.).

### **5. Engineering Analysis of Cooling Options**

Chapter 5 includes the engineering analyses for power plant reliability and efficiency, facility design, and geology and paleontology.

### **6. Conclusion: Comparison of Cooling Options**

Chapter 6 presents overall conclusions about the environmental and engineering effects of the cooling options.

## **7. References**

This chapter provides a list of references for the entire Biological Resources Appendix.

## **ROLES OF THE ENERGY COMMISSION AND THE BAY CONSERVATION AND DEVELOPMENT COMMISSION**

The Energy Commission is the Lead Agency for the review of the proposed Potrero Unit 7 Project under CEQA. As part of this analysis, the Energy Commission evaluates the potential environmental impacts of the proposed project and considers feasible mitigation for significant impacts. In this case, potential impacts of once-through cooling could occur in the areas of aquatic biology and soils/hazardous materials.

The Potrero Unit 7 Project must also be evaluated for its compliance with Laws, Ordinances, Regulations, and Standards (LORS). The McAteer-Petris Act (MPA) governs the actions of the San Francisco Bay Conservation and Development Commission (BCDC). Government Code Section 66605(b) of the MPA provides that fill in the bay should be authorized "only when no alternative upland location is available for such purpose." For a power plant proposed within the area of BCDC's jurisdiction, the MPA requires BCDC to provide the Energy Commission a report on the consistency of a proposed project with the provisions of the MPA and the San Francisco Bay Plan and the degree to which the proposed site and related facilities could reasonably be modified to be made consistent with those provisions (Government Code Section 66645(d)).

The Energy Commission is required to include in its written decision specific provisions to meet the requirements of the MPA as may be specified in the report submitted by BCDC pursuant to Section 66645(d) of the Government Code unless the Energy Commission specifically finds that the adoption of the provisions specified by BCDC would result in greater adverse effect on the environment or the provisions proposed in the report would not be feasible (Public Resources Code Section 25523(c)).

Therefore, this analysis evaluates the potential impacts of two cooling technologies that would not require bay fill.

## **AQUATIC BIOLOGY IMPACTS OF CONCERN**

The proposed Unit 7 project includes three actions that are of concern in the aquatic biology analysis: (1) intake and discharge of an additional 227 million gallons per day (mgd) of seawater for once-through cooling of Unit 7, (2) demolition of the existing intake and outfall structures, and (3) construction of a new intake and outfall structure to serve Units 3 and Unit 7.

In order to evaluate the impacts of dry and hybrid cooling systems at Potrero, the potential impacts of the proposed project (with once-through cooling) are summarized here for comparison. In contrast to the dry or hybrid cooling alternatives, once-through cooling for Unit 7 could result in several potentially significant impacts to aquatic biological resources. Construction of the new combined intake structure for Unit 7 and Unit 3 would result in a permanent loss of about 0.24 acres of aquatic habitat. About

0.15 acres of the habitat (covering a linear distance of about 200 feet of shoreline) that would be permanently lost is concrete rubble that supports a relatively depauperate rocky intertidal community of barnacles, mussels, rock jingles, shore crabs, and algae. The remaining 0.09 acres that would be lost is shallow subtidal soft bottom habitat that supports a relatively diverse invertebrate assemblage dominated by nematode, oligochaete, and polychaete worms. In addition to loss of the benthic habitats where the fill for the intake structure would be placed, the entire water column would also be permanently lost. The water column above these areas provides habitat for many species of fish, including Pacific herring, Chinook salmon, steelhead, and northern anchovy. Because San Francisco Bay is a unique estuarine ecosystem that supports many sensitive species, permanent loss of Bay habitat is considered a significant adverse impact.

Construction of the new discharge structure of Unit 7, as well as a similar outfall structure for Unit 3, would result in the replacement of natural soft bottom Bay habitat by approximately 3.2 acres of artificial structures. Construction of these submerged structures would not preclude the use of Bay waters by species associated with the water column, and the structures themselves would provide additional habitat for hard bottom species and substrate for the deposition of herring eggs. Construction of the outfalls would result in the replacement of natural Bay bottom with artificial habitat. The construction of numerous piers, jetties, pipes, and other structures has resulted in a substantial cumulative loss of natural Bay soft bottom. Thus, the proposed new outfalls would add to cumulative losses of both surface area and a defined volume of Bay water, reducing natural habitat in San Francisco Bay.

As mitigation for the loss of surface area and volume of bay water due to this fill, the Applicant has discussed with the Port of San Francisco and the Bay Conservation and Development Commission staff the removal of the derelict Wharf 5 in the Pier 70 vicinity. Removal of artificial structures in the Bay may provide adequate mitigation for the proposed fill because removal of structures would be in-kind mitigation for the placement of artificial structures. However, the details of this proposed mitigation have not yet been specified.

### **Entrainment<sup>1</sup>**

The once-through cooling system for Unit 7 would circulate up to 227 million gallons per day (mgd) of Bay water through the cooling water system. The use of Bay water for Unit 7 has the potential to approximately double the 226 mgd currently permitted for the once-through cooling system of Unit 3. Because the number of larval fishes and planktonic invertebrates sucked through the cooling water system is directly proportional to the volume of water that passes through the system, once-through cooling for Unit 7 could approximately double the losses to entrainment of Unit 3, resulting in the additional loss of many million larval fishes, fish eggs, larval invertebrates, zooplankton, and phytoplankton. These small planktonic organisms form the base of pelagic food chains in the Bay. Because San Francisco Bay is a unique estuarine ecosystem that has been severely impacted by human activities, this loss in aquatic resources would be

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<sup>1</sup> Entrainment occurs when small aquatic organisms (fish eggs, larvae, etc.) are carried on a destructive passage through the intake screens (screen mesh size usually 5/16 or 3/8 of an inch) and on through the remainder of the cooling system.

considered a significant adverse impact that could have a variety of adverse effects on the aquatic ecosystem. For example, native aquatic species in San Francisco Bay have been devastated by opportunistic, non-native species such as the Asian clam and the European green crab. Because the intake will crop the larvae of native and non-native species indiscriminately, and because invasive species generally have the ability to out-compete native species, the loss of larvae will probably favor the continued invasion of non-native species. Within 2 years following its introduction, the Asian clam spread throughout the estuary where it reached densities at some sites of over 10,000 individuals per square meter. In addition, the National Marine Fisheries Service (NMFS) has expressed concern about the loss of prey for juveniles of listed salmonids (NMFS 2001). The Applicant has not proposed mitigation for the entrainment losses.

The Applicant is currently conducting a year-long study to analyze the effects of entrainment by the combined Unit 3 and Unit 7 intake. Fish larvae that would be entrained in the greatest numbers include: unidentified gobies, yellowfin goby, Bay goby, Pacific herring, northern anchovy, and white croaker. The yellowfin goby is an introduced species. The other species subject to a substantial amount of entrainment are native to San Francisco Bay. Preliminary analysis based on six months of data suggests that entrainment would not result in a decline of any fish or invertebrate species. However, populations of some species fluctuate in San Francisco Bay and there may be years when entrainment effects are greater than indicated in the analysis.

## **Impingement<sup>2</sup>**

Fishes and mobile invertebrates would also be lost by impingement at the combined Unit 3 and Unit 7 intake. The number of organisms impinged is related to several factors, including the volume of water passed through the intake and the design of the intake. The Unit 7 project includes replacement of the existing Unit 3 intake with a new combined Unit 3 and Unit 7 intake. The new intake has several features designed to reduce impingement. With these features, impingement losses at the new intake may be reduced compared to losses at the existing intake.

The approach velocity would not exceed 0.4 feet per second. Many adult fishes can escape impingement at intake velocities below 0.5 feet per second. However, the approach velocity still may be too great to insure the safety of smaller salmonids (< 60 millimeters in length) that may be found in the project area (NMFS 2002). The NMFS recommends that to protect smaller salmonids, the approach velocity of the intake should not exceed 0.33 feet per second.

The proposed new combined Unit 3 and Unit 7 intake would have a continuously rotating inclined screen design. These screens are expected to reduce the amount of debris buildup in front of the intake, which would reduce the number of organisms trapped in debris and allow more juvenile and adult organisms to avoid impingement (SECAL 200a, AFC page 8.2-13). The Applicant also proposes to reduce impingement losses by implementing a fish return system equipped with a low-pressure spray wash. It is not clear to what extent fishes returned to the Bay with this low-pressure spray

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<sup>2</sup> Impingement of aquatic organisms occurs during cooling water intake as organisms are pulled into contact with the intake screens, and are held there by the velocity of the water being pumped through the cooling system.

wash system would survive. Some may be injured in the process. The organisms with hard exoskeletons such as small shrimps and crabs would be most likely to survive impingement. More fragile organisms such as juvenile fishes likely would not survive impingement.

It is not known at this time to what extent these design improvements would offset the greater flow from the additional cooling water for Unit 7. The actual impacts of impingement at the new intake cannot be determined until the new intake is constructed and impingement of aquatic organisms is documented.

### **Thermal Discharge**

The discharge of heated effluent from the once-through cooling system may have adverse impacts on aquatic resources. The existing discharge sometimes results in a temperature elevation at the shoreline that is 10°F above ambient (SECAL 2000b, AFC Supplement Figures 8.2-4 through 8.2-6). Elevated temperatures from the plant's existing shoreline discharge have been observed to be associated with noticeable changes in the species composition and abundance of intertidal and subtidal algae in the immediate vicinity of the discharge. However, these temperature elevations have been observed to have little effect on invertebrates or the distribution of fishes (SECAL 2000a, AFC pp. 8.2-16). The existing discharge also may have an adverse effect on the development of herring eggs deposited on structures within the area contacted by the discharge plume.

Although the Unit 7 project would result in a greater discharge of heated effluent, the new combined Unit 7 and Unit 3 outfalls, which would have long diffuser sections discharging offshore, are expected to reduce the extent of the thermal plume. The thermal plumes from the new outfalls would not contact the shoreline. Therefore, the construction of a once-through cooling system for Unit 7 with new Unit 7 and Unit 3 outfalls may reduce some of the existing thermal impacts. The diversity and abundance of intertidal and subtidal algae near the existing intake would be expected to increase. Potential thermal impacts to herring eggs also would be reduced because the new thermal discharge is not expected to contact the shoreline or the bottom. With the new outfalls, thermal impacts to herring eggs would only occur if the herring laid their eggs on the diffuser nozzles.

Although shoreline impacts would be reduced with the new Unit 3 and Unit 7 outfalls, the thermal discharge would affect habitats farther out in the Bay than the existing discharge. The National Marine Fisheries Service (NMFS) and the California Department of Fish and Game (CDFG) have expressed concern that the discharge plumes from the proposed diffusers may have significant adverse impacts on listed salmonids (J. Dillon, NMFS personal communication 2001; M. Rugg, CDFG, personal communication, 2001). The project area is within Designated Critical Habitat for the Federal Threatened Central California Coast Evolutionarily Significant Unit of steelhead. Steelhead and Chinook salmon are more common in the offshore areas where the proposed new outfalls will be located than along the shoreline areas currently affected by the Unit 3 discharge. Therefore, moving the outfalls farther offshore would increase the chances that salmonids would come into contact with the thermal plumes. Temperature rises exceeding 4°F are expected to be limited to the area immediately

above each diffuser port and would not extend along the entire diffuser section (Mirant 2001). An estimate of the maximum volume of water that would exceed 4°F is 100,000 cubic feet. Thus, impacts to listed salmonids of the thermal plumes from the proposed outfalls are unlikely, but cannot be discounted entirely. The NMFS has expressed concern about potential water column impacts of the proposed discharge to juveniles of listed salmonids (NMFS 2001). Juvenile salmonids are not strong swimmers and will move with the tide. While adult salmonids should be able to escape the heated discharge plumes with only short-term exposures, juvenile salmonids, which may be swept into the plume, may not be able to escape. The initial vertical velocity of the discharge is identified as 14 feet per second. Juvenile salmonids may be exposed to the effects of elevated water temperatures, and may be disoriented and pushed to the surface by the discharge plume. Disorientation and transport to the surface may result in increased exposure of juvenile salmonids to avian predators and larger fishes.

## **SOILS AND CONTAMINATION IMPACTS OF CONCERN**

The new intake/outfall structures that would be constructed within the San Francisco Bay would require dredging activities of 5,900 yd<sup>3</sup> for the intake structure and 200 yd<sup>3</sup> for the outfall structure. Sampling from an offshore sediment survey conducted in January 2001 showed the presence of several contaminants: poly-aromatic hydrocarbons, total petroleum hydrocarbons, arsenic, chromium, copper, lead, mercury, nickel, silver, and zinc. PCBs and pesticides were detected in a few of the samples. As documented in the Soil and Water Resources FSA Section, mitigation measures would allow construction to be completed in these areas without significant impacts. The use of dry or hybrid cooling technologies would eliminate the need for any construction in these contaminated areas.

## **2 BACKGROUND ON COOLING OPTIONS**

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### **2.0 POWER PLANT OPERATION AND COOLING**

Unit 7 at Potrero will supplement power currently generated by existing Potrero Units 3 (a 206 MW steam turbine) and Units 4, 5, and 6 (peaking turbines of 52 MW each). Unit 7 will be a state-of-the-art 540 MW natural gas-fueled combined cycle unit. The new unit will consist of two gas-fired turbines and one steam turbine.

The combined operation of Units 3 and 7 are expected to use a maximum of 453 million gallons per day (mgd) of seawater for once-through cooling. As part of the proposed Unit 7 project, the existing seawater intake structure for Unit 3 would be relocated, and a new outfall structure would be constructed.

Thermal power plants convert fuels (such as natural gas) to electrical power and waste heat. In combustion turbines, or Brayton cycles, almost all the waste heat is rejected in the exhaust gases. In steam turbines, or Rankine cycles, waste heat is rejected in the flue gases and in the condenser/cooling system. Operation of the cooling system for steam turbines serves three purposes: (1) condensing steam into water to allow pumping of a liquid instead of compressing a gas to raise the feedback to the boiler to high pressures; (2) recycling of the water back to the boiler to optimize water use; and (3) minimizing the steam turbine exhaust temperature to maximize the output of the steam turbine. The temperature of the heat sink and the heat transfer efficiency of the cooling system affect the overall plant performance. In the case of the Potrero Unit 7, the proposed cooling medium (or heat sink) is Bay water.

Combined cycle plants require less cooling than traditional fossil or nuclear steam power plants because only part of the electricity is generated from the steam cycle. In the case of the Potrero application, about 200 MW would be produced by the steam cycle. The combustion (gas) turbine parts of the combined cycle plant would not need water for cooling.

Historically, power plants were built along the coast to make use of seawater for cooling. Once-through cooling has low capital and operating costs and potential for high power plant operating performance (i.e., lower temperature heat sink), so it is still favored by plant developers. In once-through cooling, water is drawn from a local source (i.e., the ocean), passed through the condenser tubes, and returned to the ocean at a higher temperature. Although large volumes of water are required, once-through cooling does not consume water; it uses the water briefly and returns the water at an elevated temperature. Steam is condensed in a shell-and-tube condenser.

The environmental impacts of once-through cooling include impingement and entrainment of aquatic organisms and raised temperature of the cooling water when it is returned to the receiving water (thermal discharge). Because there have long been concerns about the impacts of once-through cooling and this cooling technology is dependent on an open water source, power plant designers have developed other



cooling systems to replace once-through cooling. This chapter briefly describes the three cooling technologies that can be used to replace once-through cooling: dry cooling, wet cooling<sup>3</sup>, and hybrid cooling systems. For each of the cooling technologies, this chapter provides general background information, conceptual design information, and discusses possible environmental effects of the cooling technologies for the project site.

## **2.1 DRY COOLING**

### **Description of the Process and Equipment Required**

There are two types of dry cooling systems: direct dry cooling and the lesser used indirect dry cooling. In both systems, fans blow air over a radiator system to remove heat from the system via convective heat transfer (instead of once-through cooling or evaporative heat transfer). In the direct dry cooling system, also known as an air-cooled condenser (ACC), steam from the steam turbine exhausts directly to a manifold radiator system that rejects heat to the atmosphere, condensing the steam inside the radiator. This is shown in **POTRERO UNIT 7 COOLING OPTIONS Figure 1**. Direct dry cooling is analyzed in this report.

Indirect dry cooling uses a secondary working fluid (in a closed cycle with no fluid loss) to help remove the heat from the steam. The secondary working fluid extracts heat from the surface condenser and is transported to a radiator system that is dry cooled (fans blow air through the radiator to remove heat from the working fluid). Because indirect dry cooling is not very common and does not appear to have any strategic advantages at the Potrero power plant, it will not be further analyzed in this report.

### **Historic, Current, and Proposed Use of Dry Cooling**

Dry cooling was first used in 1938 for a vacuum steam turbine installed in a power plant in Germany (Guyer, 1991). By 1971, 14 power plants worldwide had been equipped with condensers with direct dry cooling. The largest installation at that time was a roof-mounted unit for a 160 MW power plant in Utrillas, Spain. By 1991, dry cooling was being used at approximately 40 power plants worldwide with generating capacities greater than 100 MW. Since that time, use of dry cooling has also increased significantly around the world and in the United States (Guyer, 1991; USEPA, 2001; Maulbetsch, 2001).

The largest dry-cooled system in the world today is the Matimba plant in South Africa, which began operating in 1991. It represented a major scale-up of dry-cooled technology, using direct dry cooling for six 660 MW units.

One of the newest power plants in California was constructed as a dry-cooled facility. The Sutter Power Plant, constructed by Calpine Corporation, is a 540 MW, natural gas-fired, combined cycle facility. The combined cycle design consists of two combustion turbine generators (CTGs), two heat recovery steam generators (HRSGs) with duct

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<sup>3</sup> Wet cooling without plume abatement is not evaluated as an alternative in this study due to the anticipated large vapor plume that would result due to the climate conditions in the Potrero area, but the technology is briefly described, and a plume abated system (hybrid cooling) is fully analyzed.

burners, and a steam turbine generator (STG). The Sutter Power Plant uses a 100% dry cooling design that will reduce groundwater use by over 95% from the original proposal of 3,000 gallons per minute (gpm) to a revised annual average of less than 140 gpm. The five percent of the water that is used represents the make-up for the steam cycle, which is not used for cooling. The dry cooled plant is a zero effluent discharge facility and does not discharge any process fluids.

The Energy Commission also permitted a 240 MW co-generation facility with dry cooling in Crockett in 1996. The Crockett Co-Generation Plant uses 12 fans to cool the steam output from the 80 MW steam turbine. Energy Commission staff visited the facility in June 2000 and found the dry cooling to be operating as expected, with no major problems. Two other dry-cooled facilities have recently been or are currently being evaluated by the Energy Commission:

- Reliant Energy has proposed a dry-cooled facility, the 500 MW Colusa Power Project. This project is currently undergoing environmental review by the Energy Commission.
- The Otay Mesa Generating Project (OMGP), a 510 MW natural gas-fired combined cycle power plant with dry cooling, will be located in western San Diego County. The Energy Commission approved this project in April 2001.

Dry cooling is also a common technology for power plants in Nevada. Currently, the El Dorado Energy Project is the only operational air-cooled power plant facility in the State of Nevada. This 480 MW combined cycle facility is located in Boulder City. Two other combined cycle air-cooled power plants are currently under construction in Nevada: the Duke Energy 1,200 MW Moapa Energy Facility (approximately 20 miles northeast of Las Vegas in Apex Industrial Park) and the 575 MW Big Horn Power Plant (in Primm, southwest of Las Vegas). In addition, there are four combined cycle air-cooled power plants proposed to be constructed in Nevada. These facilities include: Apex Generating Station (1,100 MW), Arrow Canyon (575 MW), and Silver Hawk (570 MW) facilities at the Apex Industrial Park, and the Copper Mountain Power Facility (600 MW) in Boulder City.

Energy Commission staff researching the use of dry cooling have seen that the use of dry cooling technology is expanding rapidly, and the sizes of the plants are also increasing. It is estimated that there are over 2,500 MW of U.S. power generated using dry cooling, and approximately 15 to 20 GW worldwide.

**POTRERO UNIT 7 COOLING OPTIONS Photos 1 and 2** (at the end of this section) show examples of dry cooling installations.

### **Advantages and Disadvantages of Dry Cooling**

Dry cooling is the best choice of cooling technologies for a steam power plant in terms of water conservation and wastewater minimization. However, this technology can raise other environmental and economic issues, depending on the location and specific situation (these are reviewed in detail for the Potrero site in Chapter 4 of this report). The following is a general list of the advantages and disadvantages of dry cooling.

## Advantages of Dry Cooling Systems

- Not water dependent so plant location is not tied to a water source (essentially no water intake or water discharge requirements).
- Minimizes the use of water treatment chemicals.
- Minimizes the generation of liquid and solid wastes.
- Does not generate visible plumes that are commonly associated with wet cooling towers.
- Eliminates impacts to aquatic biological resources.
- Reduces the number of permits and potential permit delays.
- Reduces maintenance costs in comparison with once-through cooling.

## Disadvantages of Dry Cooling Systems

- Requires large air-cooled condensers that could have negative visual effects.
- Compared to once-through cooling, requires the disturbance of upland areas for the air-cooled condensers.
- Can create greater noise impacts than once-through or wet cooling systems because of operation of large fans. Fan configuration can be modified and other mitigation measures implemented to reduce noise.
- Using dry cooling, the power plant steam cycle efficiency and output can be slightly reduced, depending on site conditions and seasonal variations in ambient conditions. Also, extra power is needed to operate the cooling fans.
- Increases capital costs (for building air-cooled condensers) over the capital costs for once-through cooling <sup>4</sup>.

## 2.2 WET COOLING

### Description of the Process and Equipment Required

Wet cooling systems use about 5% of the water used by once-through cooling systems. The water removes waste heat from the system through the cooling towers, and the water is recirculated. In wet cooling systems, process heat is removed by evaporation each time the water is cycled through the system. **POTRERO UNIT 7 COOLING OPTIONS Figure 2** shows how a typical wet cooling system operates.

The cooling system must be replenished with “make-up water” to replace water “lost” (or consumed by) to evaporation, blowdown<sup>5</sup>, and drift. The cooling system takes advantage of evaporation to remove heat, but cooling system water is consumed

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<sup>4</sup> Capital costs are variable depending on the site and application; note that as described in Section 3 of this appendix, the capital costs for once-through cooling for Potrero Units 3 and 7 are estimated to be very similar to those of hybrid cooling.

<sup>5</sup> Blowdown is the bleeding off of a small percentage of the total flow, so that the new more pure make-up water balances the impurities so that the water quality in the system stays within specifications.

through evaporation. Evaporation causes the concentration of impurities. Blowdown volumes are dependent on the quality of the make-up water and the system specifications regarding the impurities that are in the make-up water. Other methods of conserving water can be used, such as reverse osmosis (RO). **POTRERO UNIT 7 COOLING OPTIONS Photo 3** is a close-up view of mechanical draft cooling towers.

### **Current Uses of Wet Cooling**

Wet cooling is one of the most common technologies in the world for the removal of waste heat, including many applications at power plants. Wet cooling towers are a major tool in heat removal from the approximately 500 billion gallons a day used by U.S. industries (Burger, 1994).

### **Advantages and Disadvantages of Wet Cooling**

The following is a general list of the advantages and disadvantages of wet cooling.

#### **Advantages of Wet Cooling Systems**

- Uses only about 5% of the water required for a once-through cooling system.
- Once a wet cooling system is filled, the only water withdrawn from the environment is makeup water to replace water lost to evaporation, blowdown and drift.
- Removes heat by the evaporation of a small fraction of the recirculating water.
- Can reach “wet bulb” temperatures, which are generally lower than “dry bulb” temperatures, thus improving cooling efficiency in comparison to dry cooling systems.

#### **Disadvantages of Wet Cooling Systems**

- Requires a dependable source of water.
- Although more efficient than dry cooling, the power plant steam cycle efficiency and output can be slightly reduced with wet cooling systems when compared to once-through cooling systems, depending on site conditions and seasonal variations in ambient conditions.
- Requires water treatment and monitoring to control concentrations of impurities.
- Can produce water vapor plumes that have negative aesthetic effects.
- Capital and maintenance costs for wet cooling systems are generally higher than these costs for a once-through cooling system.

## **2.3 HYBRID (WET/DRY) COOLING**

### **Description of the Process and Equipment Required**

Hybrid cooling systems combine wet and dry cooling technologies. The two primary hybrid systems are water conservation and plume abatement designs. These hybrid systems can vary depending upon the unique situation and objectives (Burns, 2000).

Water conservation designs reduce water usage for plant heat rejection. Water is primarily used during the hottest periods of the year to reduce the large losses in steam cycle capacity and plant efficiency that occur with all-dry systems. The hybrid water conservation systems can limit water use to only 2% to 5% of that required for all-wet systems while achieving substantial efficiency and capacity advantages during the peak load periods of hot weather. If more water is available, it can be used to further increase plant efficiency.

Another water conservation hybrid approach is Spray-Enhanced Dry Cooling. In these systems, the exhaust steam is pre-cooled with spray before it reaches the air-cooled condenser. This system uses 25% of the water used for all-wet cooling, but reduces the capacity loss that occurs with all-dry cooling (Maulbetsch, 2001).

The most common type of hybrid system is the hybrid plume abatement system. Plume abatement towers are very similar to all-wet systems, but they also add a small amount of dry cooling to dry out the tower exhaust plume during cold, high-humidity days when the plumes would be very visible. POTRERO UNIT 7 COOLING OPTIONS Figure 3 shows the similarities between wet towers and hybrid plume abatement towers. On an annual basis, the hybrid plume abatement towers can use from 95% to 99% of the water quantity used in conventional wet cooling system. The goal of the plume abatement towers is to achieve high plant efficiency similar to the wet towers, but with reduced plumes.

### **Current Use of Hybrid Cooling**

Plume abatement wet/dry towers have been used since the 1970s with proven reliability. The parallel condensing cooling systems (with both a wet tower and a dry cooling tower) have been used since at least since the late 1980s. GEA Power Cooling Systems is one vendor that provides a parallel condensing system called the PAC Parallel Condensing System. This system combines reliable wet cooling and dry cooling tower technologies.

### **Advantages and Disadvantages of Hybrid Cooling**

The following is a general list of the advantages and disadvantages of parallel condensing hybrid cooling.

#### **Advantages of Parallel Condensing Hybrid Cooling Systems**

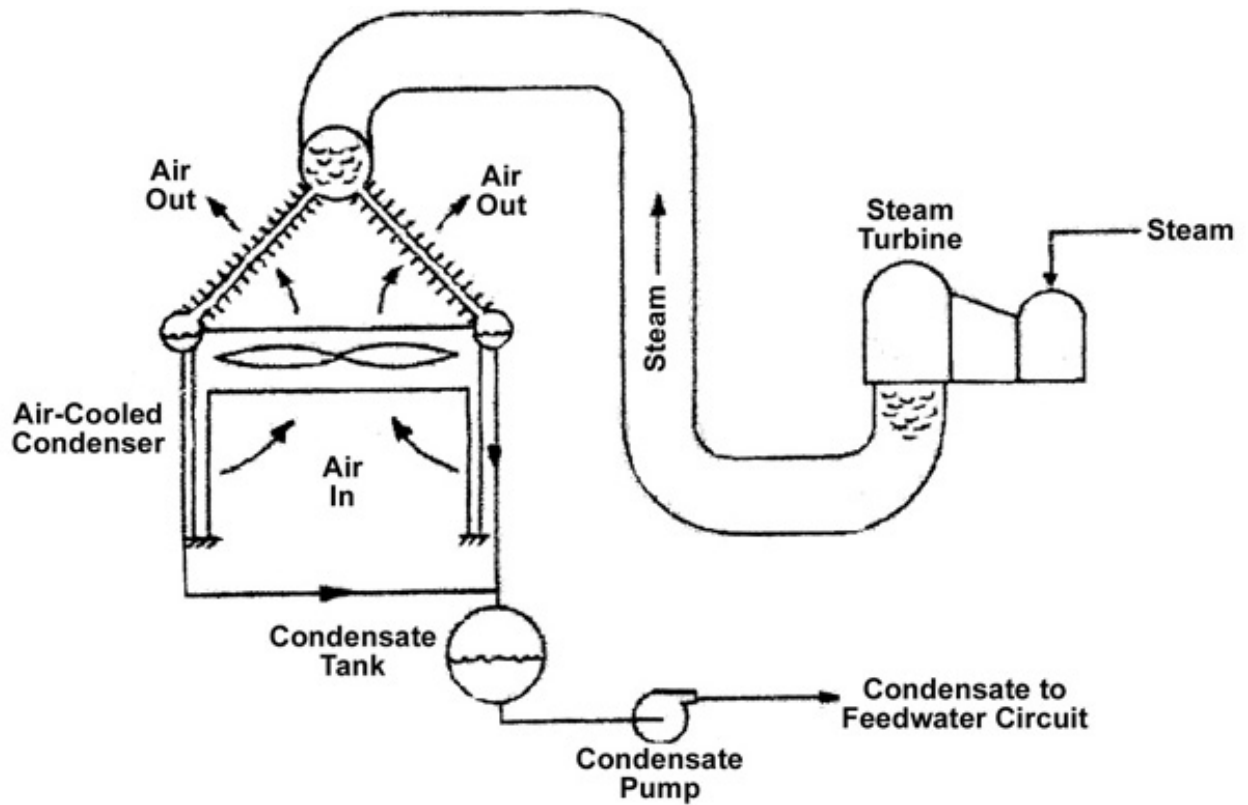
- Water conservation hybrid systems use only 20% to 80% of the water consumed by wet towers.
- Once a parallel condensing hybrid cooling system is filled, the only water withdrawn from the environment is makeup water to replace water lost to evaporation, blowdown and drift. Water loss is less than the water loss from all-wet cooling systems.
- Parallel condensing hybrid cooling can reach “wet bulb” temperatures in the wet portion of the system. These wet bulb temperatures are generally lower than “dry bulb” temperatures, thus improving cooling efficiency in comparison to an all-dry cooling systems.

- Because of the lowered water requirements, parallel condensing hybrid cooling systems can avoid the use of seawater when available fresh or recycled water may not be sufficient to meet the demands from an all-wet cooling system.

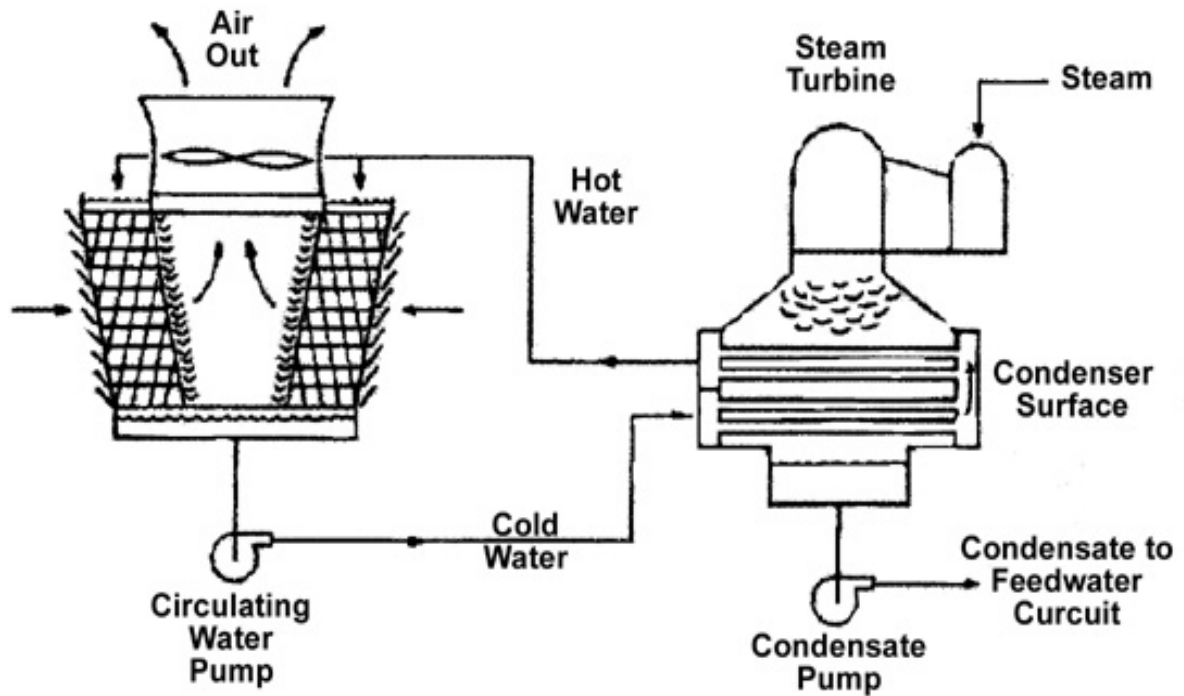
### **Disadvantages of Parallel Condensing Hybrid Cooling Systems**

- Requires a dependable source of water.
- Although more efficient than dry cooling, the parallel condensing hybrid cooling system would not be as efficient at once-through or wet cooling.
- Requires water treatment and monitoring to control concentrations of impurities.
- Can produce water vapor plumes that have negative aesthetic effects.
- Capital and maintenance costs for parallel condensing hybrid systems are generally much higher than once-through or wet systems.
- Require large air-cooled condensers and wet cooling towers that could have negative visual effects.
- Compared to once-through cooling, parallel condensing hybrid cooling systems dry cooling requires the disturbance of upland areas, for the air-cooled condensers and wet cooling towers.

POTRERO UNIT 7 COOLING OPTIONS Figure 1  
Diagram of Direct Dry Cooling System

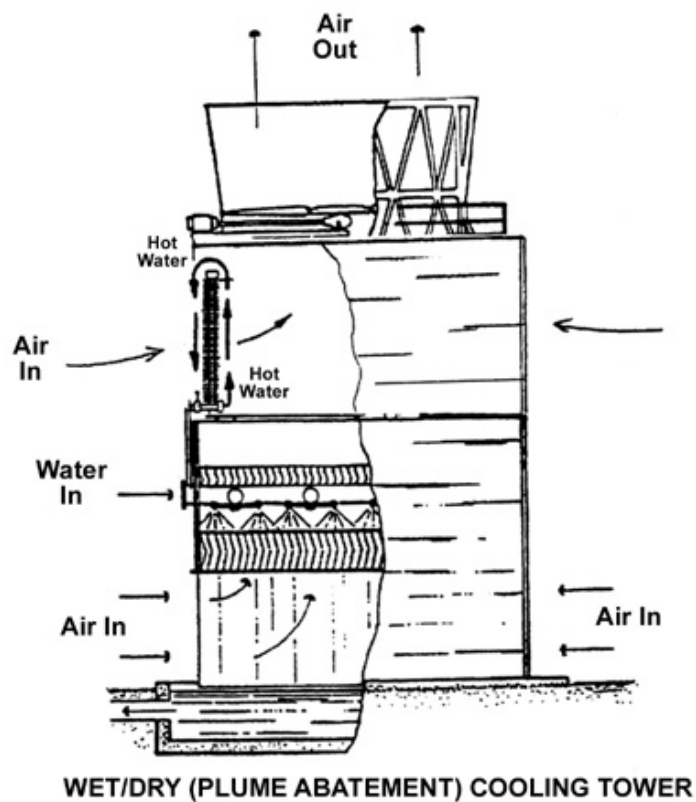
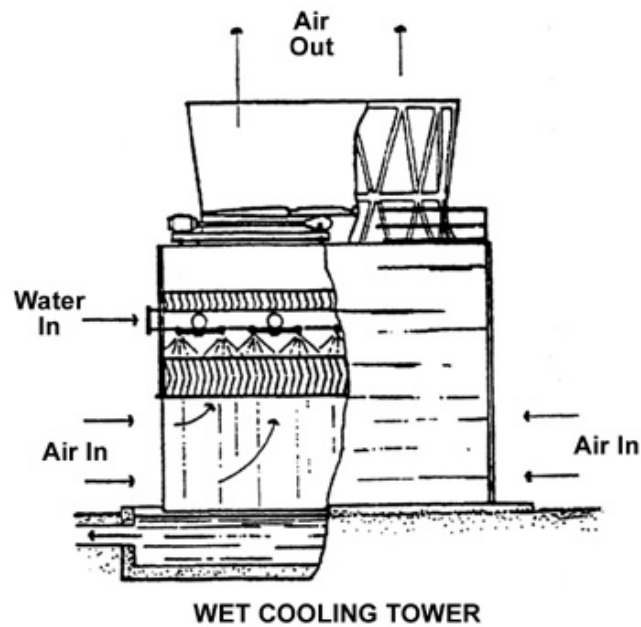


**POTRERO UNIT 7 COOLING OPTIONS Figure 2**  
**Wet Cooling System with Surface Condenser and Mechanical Draft Cooling Tower**





**POTRERO UNIT 7 COOLING OPTIONS Figure 3**  
**Comparison Drawings of a Wet Tower and a Hybrid Plume Abatement Tower**



**POTRERO UNIT 7 COOLING OPTIONS Photo 1**  
**Mid-Distance View of Dry Cooling System at the Sutter Power Plant**  
(Shown within the box.)



**POTRERO UNIT 7 COOLING OPTIONS Photo 2**  
**Close-Up View of the Dry Cooling System at the Sutter Power Project**



**POTRERO UNIT 7 COOLING OPTIONS Photo 3**  
**Close-Up View of Mechanical Draft Cooling Towers**  
(Shown within the box.)





### **3 CONCEPTUAL DESIGN OF COOLING OPTIONS FOR THE POTRERO POWER PLANT**

#### **3.1 DESCRIPTION OF THE PROPOSED PROJECT**

Unit 7 is proposed to be a combined cycle electric generating unit consisting of two General Electric Frame 7F combustion turbines (CTGs) and one steam turbine generator (STG). The combustion turbines will draw in air through a compressor section and add natural gas for purposes of combustion. The resulting hot gases will expand through a power section of the CTGs and drive electric generators. The hot exhaust gases are then passed through two heat recovery steam generators (HRSGs) to produce steam that is directed to a single STG driving and additional electric generator. After expansion through the STG the now low-pressure steam must be condensed back to water to be pumped again through the HRSGs.

The applicant has proposed the use of a once-through cooling system for Unit 7. This would consist of drawing water from the San Francisco Bay through a shoreline intake structure, passing it through the power plant condenser to cool the steam discharged by the steam turbine portion of the plant and then discharging the heated water back to the bay via discharge pipes that extend some 900 feet offshore.

Section 3.2 describes cooling technologies studied in this report. Section 3.3 describes the design of a dry cooling system, and Section 3.4 describes the hybrid system. Chapters 4 and 5 of this report present an analysis of the environmental and engineering impacts of these cooling technologies.

#### **3.2 COOLING TECHNOLOGIES CONSIDERED**

As a result of the potential biological impacts that may occur with once-through cooling design (see Chapter 1), Energy Commission Staff has reviewed alternative cooling technologies as possible alternatives to once-through cooling. These technologies would not require the use of any water from the San Francisco Bay for power plant cooling. Two types of alternative cooling technologies are considered:

1. A dry or air-cooled condenser that transfers the heat from the steam turbine exhaust directly to the atmosphere (therefore neither drawing nor discharging water from the Bay).
2. A hybrid (wet-dry) cooling tower using treated reclaimed water and combines the dry with a wet cooling tower technologies to cool the plant STG exhaust. It is the staff's position that makeup water requirements for the cooling tower options should not come from freshwater sources. Therefore, this analysis considers makeup water from the nearby Southeast Water Pollution Control Plant (SWPCP) for use in the hybrid cooling system.

A third cooling technology was also considered: a straight wet cooling system using treated reclaimed water. However, the third alternative has been eliminated from further

consideration because it would emit highly visible vapor plumes when the ambient temperature is cool and the relative humidity is high. Because these conditions are quite common at the Potrero site, and frequent vapor plumes would not be considered acceptable in this location, a wet cooling alternative was not evaluated.

The dry and hybrid cooling systems addressed herein would have no effect on the existing intake and discharge systems for Unit 3. It is presumed in this analysis that the existing intake and outfall would be unchanged.

### 3.3 DRY COOLING

#### Design Criteria

In order to compare the performance and impacts of a dry or air-cooled condenser (ACC) with that of the once-through system, the operating conditions at a common design point must be established. The design and operation of an ACC is highly dependent upon the ambient conditions at a specific site. Therefore, design criteria that are based on expected site conditions have been established upon which to base the conceptual design. For purposes of this analysis the design conditions set forth in the applicant's Application for Certification were used for comparison. A final design and optimization for these criteria would be necessary if the dry alternative were to be selected as the preferred alternative.

**POTRERO UNIT 7 COOLING OPTIONS Table 1** shows the criteria used in the design of the air-cooled system.

**POTRERO UNIT 7 COOLING OPTIONS Table 1**  
**Potrero Unit 7 Dry Cooling Tower Conceptual Design Criteria**

<b>Parameter</b>	<b>ISO*</b>	<b>Winter</b>	<b>Summer</b>
Site Elevation	25 feet	25 feet	25 feet
Dry Bulb Temp <sup>6</sup>	59°F	35°F	80°F
Wet Bulb Temp <sup>7</sup>	51.5°F	30°F	63.5°F
Relative Humidity	60%	50%	40%
Steam Flowrate (lb/hr)	1,115,379	1,399,927	1,371,605
Steam Turbine Exhaust Temp	109°F	85°F	130°F
Enthalpy (Btu/lb)	1118	1109	1098
Backpressure	less than 5"Hg	less than 5"Hg	less than 5"Hg

\* International Standards Organization.

<sup>6</sup> Dry bulb temperature is the temperature as indicated by an ordinary thermometer, without accounting for humidity in the air.

<sup>7</sup> Wet bulb temperature accounts for the relative humidity in the air (the largest differences between wet and dry bulb temperatures would occur in very dry conditions).

Using the above criteria a single design point was selected that reflected the site conditions considered to be reasonable for purposes of this analysis. The design point used assumed the following conditions:

- Steam flow 1,371,605 pound per hour
- Steam quality 100%
- Inlet air temperature 80°F
- Turbine backpressure 4.53 in Hg

### **Size, Configuration and Layout**

The size of the ACC is a function of the heat load from the steam turbine generator and the ambient conditions. As described in Chapter 2, the ACC is comprised of tube bundles with fins attached to the tubes to enhance heat transfer to the air. These bundles are grouped together and mounted in an A-frame configuration on a steel support structure. These A-frame tube bundles are lined up into rows or bays. The steam is ducted directly from the steam turbine exhaust to the ACC where it enters in a parallel flow into the tubes across the top of the bays. Air is blown from below across the finned tube bundles by a series of large fans. The fans are located beneath the A-frame tube bundles with each fan considered as a module. To accommodate the large mass of air required for cooling the steam, the A-frame tube bundles are elevated on top of an open structure. As the steam passes down through the tube bundles, it is condensed. The condensate drains by gravity flow into a tank and is then pumped back to the HRSG. Since the steam is exhausted directly from the steam turbine generator after it has expanded through the turbine, it is at a very low pressure and thus a large volume. This condition limits the distance that the ACC can be located from the steam turbine generator due to the drop in pressure that results during the transport of the steam.

For the Potrero site, the preliminary design configuration using the above stated design criteria resulted in the following design parameters for the ACC:

- No. of bays 7
- No. of fans per bay 5
- No. of fan modules 35
- Fan diameter 32 feet
- Height to top of steam duct 108 feet
- Main steam duct diameter 20 feet

The factors require an ACC with a plot area of 269 feet by 192 feet. Within the existing plant boundary, there is only one location large enough to accommodate these ACC space requirements. This location, Dry Cooling Alternative One, is directly west of existing Unit 3 near the southern boundary of the plant site. The plan and elevation of Dry Cooling Alternative One are shown on **POTRERO UNIT 7 COOLING OPTIONS Plates 1 and 2** (at the end of this chapter).

While the ACC can physically fit into this space, the condenser would then be located over 500 feet away from the steam turbine. This distance raises concerns because the manufacturers' general recommended criteria limit the length of the steam pipe to about

200 feet<sup>8</sup>. Consideration was given to relocation of the steam turbine generator closer to the air-cooled condenser and piping the high-pressure steam the longer distance. While this configuration is functionally feasible, it would require further engineering evaluation due to lengths of high pressure steam piping, condensate return piping, location of electrical interconnections, as well as operational constraints of operating components of the system spread over relatively large distances.

Due to the potential operational problems with Dry Cooling Alternative One, a second location for the ACC, Dry Cooling Alternative Two, has also been considered. Dry Cooling Alternative Two would allow the air-cooled condenser to be located closer to the steam turbine generator. The ACCs in this case would be located north of the plant entrance road and west of the existing fuel oil tanks on property currently owned by Pacific Gas and Electric Company<sup>9</sup>. To accommodate this site the steam turbine generator would be relocated north of the combustion turbine generators that would in turn be moved further south (reversing their positions proposed). The plant entrance road would either be rerouted or built to cross the large steam duct. **POTRERO UNIT 7 COOLING OPTIONS Plates 3 and 4** (see end of this Chapter) show the layout and elevation of Dry Cooling Alternative Two.

## **Heat Balance**

The amount of power that the steam turbine can produce is directly related to its exhaust pressure. Simply stated, the higher the temperature and pressure of the steam entering the steam turbine generator, the more energy or potential for work it contains. Correspondingly, the lower the temperature and pressure of the steam exhausted into the condenser, the greater the amount of energy extracted from it to produce electricity. Therefore, the colder the cooling source for the condenser, the greater the potential output of the steam turbine generator. When using the ACC, the ambient dry bulb temperature of the atmosphere directly controls the condensing temperature. Because the ACC cannot bring the temperature of the steam to match that of the ambient dry bulb, there is always a difference between the turbine exhaust temperature and the outside temperature. This difference is called the Initial Temperature Difference (ITD). Generally the ITD will be on the order of 50°F. Thus for the ambient temperature of 80°F the steam turbine exhaust temperature would be 130°F. This temperature translates directly to the pressure within the condenser or backpressure of the turbine. For a turbine operating with an air-cooled condenser at the above stated design conditions, the backpressure would be 4.53 inches of mercury (in HgA). This would compare to the backpressure of the once-through case of approximately 1.46 in HgA. Since a colder cooling water condensing source translates to a greater output for the steam turbine, it is estimated that using the air-cooled condenser will result in a reduction of output from the STG of approximately 7 to 10 MW.

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<sup>8</sup> While the manufacturer's standard recommendation is that the steam pipe not exceed 200 feet, potential engineering measures would need to be evaluated to determine whether dry cooling would be feasible at the Potrero site.

<sup>9</sup> The PG&E property may not be available to Mirant for use for the ACCs, so the feasibility of Dry Cooling Alternative Two is questionable. However, the site was retained in this analysis in order to allow evaluation of the environmental impacts of dry cooling at this location.



## **Auxiliary Loads**

The ACC requires additional power to operate the 35 fans used to circulate air over the tube bundles. Each fan has a diameter of 32 feet and is driven by a 200 horsepower motor. All together, the total shaft power required to operate the fans comes to 5,815 kW. This however, is somewhat offset by the fact that the ACC does not have a requirement to circulate cooling water through condenser tubes as does the once through alternative. Based on the applicants proposed design there would be two 79,000 gpm pumps used to provide the cooling water to Unit 7. It is estimated that these pumps will require approximately 1,500 kW each. Thus the net increase in auxiliary power requirements for the air-cooled condenser case is approximately 2815kW. Allowing for other miscellaneous ACC loads as well as the conceptual nature of this analysis, a reasonable estimate for the differences in auxiliary loads between the once-through and ACC cooling systems is 3-5 MW.

## **Efficiency**

With an ACC, two factors cause a reduction in plant output as compared with a once-through cooling system. First, the higher condenser backpressure causes a loss of power generated by the steam turbine. Second, auxiliary loads from the fans also require power for their operation. Using the once-through case as the basis for comparison, the plant will burn 191,664 pounds per hour of natural gas at the summer design point using supplemental duct firing. The fuel use is measured in British Thermal Units (Btus); therefore, the units used to portray the efficiency of a power plant are Btus per kWhr. This is identified as the plant heat rate. Generally, a combined cycle similar to the Potrero plant will have a net plant heat rate of approximately 7,000 Btu/kWhr.

Assuming this as the base for the once-through design and assuming an equivalent fuel consumption for the dry cooling alternative, the heat rate of the plant would increase reflecting a decrease in efficiency due to lower net output of the Unit 7. This lower output is caused by a the combination of reduced steam turbine generator output due to the higher condenser back pressure and the greater auxiliary loads due the requirement of the air-cooled condenser fans. Assuming the maximum losses for both the power generated as well as auxiliary loads (10MW and 5 MW, respectively), the new plant heat rate would be approximately 7,172 Btu/kWhr or an increase of approximately 2.5%. If the minimum losses are assumed, the new plant heat rate would be 7,114 Btu/kWhr or an increase of 1.6%.

## **Cost**

The capital cost estimate for the air-cooled condenser (ACC) alternative has been developed using budget level estimates from an ACC supplier. These estimates were based on the design criteria given in Table 1. If the system were to be designed to reflect different ambient conditions, the costs could increase or decrease; however, such a determination would be made on a complete optimization of the plant performance including a cost/benefit assessment that could result in improved performance. The costs provided by the ACC supplier include: equipment engineering, materials, tube bundles, support structures, fans and accessories, motors, steam distribution headers, condensate collection tank, steam jet ejectors, and delivery to the

site. Additional capital costs to complete the system include: unloading and handling of equipment and materials, erection labor and supervision, painting, engineering/design interface, steam duct supply and installation from the STGs to the ACC, and equipment to perform the erection services. The total capital cost estimate for the ACC alternative for Unit 7 is \$35,290,000. Table 2 gives a breakdown of these costs.

**POTRERO UNIT 7 COOLING OPTIONS Table 2**  
**Capital Cost Estimate Dry Cooling Alternative**

Item	Cost Estimate
Suppliers Equipment	\$18,620,000
Bulk mat'l & misc. small equipment	2,100,000
Installation	7,429,000
Indirects and Fees	7,141,000
Total Cost	\$35,290,000

These costs would be offset by a reduction of expenditures by the Applicant for the proposed once-through system, as described in section 3.5 of this analysis. The estimated costs associated with the proposed cooling water system is approximately \$25.1 million. This would mean that the differential cost for the dry cooling alternative would be an increase of approximately \$10.2 million.

Routine operation and maintenance costs for the ACC are minimal. Since the system is completely closed, there is no chemical treatment required. There is routine maintenance required for the fans, motors, and gearboxes. The finned tubes may need periodic cleaning and touchup, or repainting of the equipment and structure would be performed. Estimates for the operation and maintenance of the ACC range from \$50,000 to \$150,000 per year.

### **3.4 HYBRID (WET/DRY) COOLING**

#### **Design Criteria**

The design and operation of the hybrid cooling alternative is also highly dependent upon the ambient conditions at the specific site location. Therefore, a set of design criteria consistent with that established for the dry alternative and the AFC has been applied to establish a conceptual design. These criteria are not intended to form the final design basis but are used for comparative analysis only. If the hybrid cooling alternative were to be selected, further optimization for these criteria would be necessary.

**POTRERO UNIT 7 COOLING OPTIONS Table 3** shows the conceptual design criteria used for the analysis of the hybrid case.

**POTRERO UNIT 7 COOLING OPTIONS Table 3**  
**Hybrid Cooling Tower Conceptual Design Criteria**

<b>Parameter</b>	<b>ISO*</b>	<b>Winter</b>	<b>Summer</b>
Site Elevation	25 feet	25 feet	25 feet
Dry Bulb Temp	59°F	35°F	80°F
Wet Bulb Temp	51.5°F	30°F	63.5°F
Relative Humidity	60%	50%	40%
Steam Flowrate (lb/hr)	1,115,379	1,399,927	1,371,605
Cooling water flowrate (gpm)	148,000	148,000	148,000

\* International Standards Organization.

Using the above criteria a single design point was selected that reflected the site conditions considered to be reasonable for purposes of this analysis. The design point used assumed the following conditions.

- Steam flow                      1,371,605 pound per hour
- Steam quality                100%
- Coldwater temp              70°F
- Hot water temp               91.5°F
- Turbine backpressure       3.0 in Hg

### **Water Supply**

The hybrid cooling alternative is comprised of a combination wet cooling tower with a dry section mounted on top for purposes of abating the visible vapor plume that would occur during periods of cool, high humidity weather. The concept of this design is to use the wet portion of the tower to provide a primary cooling source for the cooling water that is circulated through the plant condensers and then a dry portion to reheat the exiting air to a temperature above which a vapor plume will not form.

A hybrid configuration for cooling Unit 7 will require water to makeup losses through evaporation, drift, and blowdown from the tower. As water passes over the wet portion of the hybrid tower, some of it will be evaporated and thus require replacement. Additionally, due to the evaporation losses the remaining water will increase in mineral content, which would eventually deposit on the tower reducing its effectiveness. To avoid this a portion of the water is discharged or blowdown and replaced with treated reclaimed water. Also, some of the water is lost as a mist (called "drift") that is carried up as a result of the airflow through the tower. By use of specifically designed drift eliminators, this loss is reduced to 0.0005% of the cooling water flow.

The sum of these losses must be made up with the addition of the treated reclaimed water. The source of make up water would be from the City of San Francisco's Southeast Water Pollution Control Plant (SWPCP). Currently, the SWPCP treats wastewater to a secondary level prior to discharge to the San Francisco Bay. Secondary effluent is not suitable for use in the cooling tower without filtration and disinfection to meet California Code Regulations Title 22 standards for turbidity and

coliform content. Therefore, additional water treatment will be required before use in the cooling tower. This additional treatment to the reclaimed water is technically feasible and would require more detailed design to evaluate whether the best location for the facilities would be expansion of SWPCP or a location at the Unit 7 site. However, there appears that sufficient space could be made available at either site. One possible treatment process is described in the following paragraphs. It is estimated that the average makeup requirement for the Potrero Unit 7 will be 3.5 to 4 million gallons per day. The SWPCP facility has the capability to treat approximately 65 million gallons per day of wastewater.

The SWPCP is located approximately 1.2 miles from the plant and would require the construction of a new delivery pipeline estimated to be 16 inches in diameter and a return pipeline of 8 inches in diameter. The return line would transport the cooling tower blowdown back to the SWPCP for treatment. The route of these pipelines would be along Third Street and pass under the Islais Creek Channel. Subject to an agreement between the City of San Francisco and Mirant the additional treatment facilities could be located either at the SWPCP or possibly at or near the project site.

The additional treatment of the secondary effluent would employ physical and chemical methods to produce water suitable for use in the cooling tower. The reclaimed water pretreatment system would use microfiltration equipment as the central technology. The microfiltration process would significantly lower the turbidity and total suspended solids (TSS) levels in the water. In a microfilter, the water is pressurized and forced through micropores removing many forms of TSS, virus, and bacteria typically found in secondary treated effluent.

In addition to solids, dissolved phosphorus is removed from the secondary effluent water in the microfiltration process. Phosphates are removed as a means of limiting microbiological activity in the cooling tower makeup water. Phosphate removal is achieved by injection of alum upstream of the microfilter to precipitate aluminum phosphate solids. These solids are then removed by the microfiltration membranes. Sulfuric acid is also added to promote the efficiency of the precipitation process. The microfiltration equipment is backwashed on a regular basis to clean the membranes. The backwash water is combined with the cooling tower blowdown and returned to the SWPCP. With some further treatment, the secondary treated reclaimed water could also be used in place of city water as makeup to the boiler feedwater. This would reduce Unit 7's use of potable water for nonpotable uses, which would be considered an "unreasonable" use under the California Water Code when reclaimed water is available.

According to SWPCP staff, the SWPCP is shutdown for maintenance 12 times per year, with the longest duration being 22 hours. This would necessitate Unit 7 being provided with sufficient storage to continue operation during these periods. Storage facilities for 3.5 to 4 million gallons of water would be required either at the SWPCP, at the Potrero Power Plant site, or both.

### **Size, Configuration, and Layout**

The configuration of a hybrid cooling tower combines finned tube heat exchangers, dry sections and conventional evaporative cooling, or wet sections using fans to draw the

air through the tower. Air is drawn in parallel through both the air-cooled section and the evaporative section. As the air passes through the wet section of the tower it picks up moisture. If the moisture in the air reaches saturation it forms a vapor and a plume becomes visible, which can be eliminated by mixing the moist air with dry air from the dry section, thus keeping it from becoming saturated. Therefore, the tower consists of a lower wet section where water droplets are passed over fill material, and finned tubes above. From a distance the tower appear much like a radiator. On top of these sections is the deck where the fans are located within housings that extend above the deck.

The size of the hybrid cooling tower is a function of the heat load and the ambient conditions at the site. For the Potrero site, the assumed design point near the summer conditions was used. This results in a tower that is approximately 500 feet long by 50 feet wide and approximately 56 feet high to the fan deck and 70 feet to the top of the fan housing. The tower would consist of 10 fans approximately 30 to 32 feet in diameter that would draw air up through the wet and dry sections of the cooling tower. Each fan services one cell of the cooling tower. This design and its location are illustrated in **POTRERO UNIT 7 COOLING OPTIONS Plates 5 and 6.**

The cooling tower location would be located along the southern boundary of the Potrero property. Cooling water would be piped to the steam turbine condenser located directly below the turbine. After circulating the cooled water through the condenser, the water is returned to the cooling tower to be cooled again by evaporation.

### **Heat Balance**

Since the hybrid plume-abated tower takes advantage of the effects of evaporation, it has the capacity to reduce the temperature of the cooling water to a point closer to the wet bulb ambient temperature. This allows the steam turbine generator to operate more efficiently than with a straight dry cooling system. Generally, the cooling water can be brought to within 8°F of the ambient wet bulb temperature and the steam turbine exhaust to within 6°F of the return cooling water temperature. This would result in the condenser operating at a temperature of 97.5°F. Application of the 10-cell cooling tower described in this conceptual analysis would result in a somewhat higher condenser operating temperature and a corresponding backpressure of the turbine of 3.0 in Hg. This would compare to the backpressure of the once-through case of approximately 1.46 in HgA. The differential in output between the once-through cooling water system and the hybrid cooling alternative is a loss of approximately 4.5 MW for the average summer condition. This difference would be greater during periods of extreme ambient temperatures.

### **Auxiliary Loads**

The hybrid cooling system requires additional power to operate the 10 fans used to circulate air through the tower. Each fan has a diameter of 30 to 32 feet and is driven by a 200 horsepower motor. Altogether, the total shaft power required to operate the fans comes to approximately 1,500 kW. Since both the wet/dry cooling tower and once-through system require circulating water pumps, these loads are considered to be close to equal. There would also be some additional power requirements to pump the makeup water from the SWPCP to Potrero and return the cooling tower blowdown.

## **Efficiency**

The higher condenser back pressure and corresponding loss of power generated by the steam turbine plus the additional auxiliary loads from the fans and water pumping requirements would reduce the efficiency of the overall power generation cycle for the hybrid system. The measure of power plant efficiency is the comparison of the amount of fuel required to generate a kilowatt-hour of electricity. Using the once-through case as the basis for comparison, the plant will burn 191,664 pounds per hour of natural gas at the summer design point using supplemental duct firing. The fuel use is measured in British Thermal Units or Btus therefore the units used to portray the efficiency of a power plant are Btus per kWhr. This is identified as the plant heat rate.

Generally, a combined cycle plant like Potrero would have a net plant heat rate of approximately 7,000 Btu/kWhr. Assuming this as the base for the once-through design and assuming an equivalent fuel consumption for the wet/dry cooling alternative, the heat rate of the plant would increase reflecting a decrease in efficiency due to lower net output of the Unit 7. This lower output is caused by a the combination of reduced steam turbine generator output due to the higher condenser back pressure, the greater auxiliary loads due to the requirement of the wet/dry cooling tower fans and the additional pumping requirements for delivery of the makeup water. The power requirements for the pumping load associated with delivery of the reclaimed water have not been included in this estimate since it is unknown at this time if it will be included with the agreement to provide the water. Thus the new plant heat rate is estimated to be approximately 7068 Btu/kWhr or an increase of approximately 1%.

## **Cost**

The capital cost estimate for the hybrid wet/dry alternative has been developed using budget level estimates. These estimates were based on the design criteria given in Table 3. If the system were to be designed to reflect different ambient conditions, the costs could increase or decrease; however, such a determination would be made on a complete optimization of the plant performance including a cost/benefit assessment that could result in improved performance. The capital costs included in this assessment: equipment, engineering, materials, support structures, tower fill materials, finned tubes, fans, fan housings and accessories, motors, distribution headers, foundation and concrete basin, new cooling water pumps, and equipment delivery to the site. Additional capital costs to complete the system include: unloading and handling of equipment and materials, erection labor and supervision, painting, engineering/design interface, and equipment to perform the erection services. The costs also include an estimated cost for a tertiary water treatment plant and pipeline to delivery the water to Unit 7 via city streets. The total capital cost estimate for the hybrid alternative for Unit 7 is \$27,057,600. Table 4 provides a breakdown of these costs.

**POTRERO UNIT 7 COOLING OPTIONS Table 4**  
**Capital Cost Estimate Hybrid Cooling Alternative**

Item	Cost Estimate
Equipment	\$10,327,600
Bulk mat'l & misc. small equipment	4,490,000
Installation	6,250,000
Indirects and Fees	5,990,000
Total Cost	\$27,057,600

These costs would be offset by a reduction of expenditures by the Applicant for the proposed once-through system, as described in section 3.5 of this analysis. The estimated costs associated with the proposed once-through cooling water system is approximately \$25.1 million. This would mean that the differential cost for the hybrid wet/dry cooling alternative would be an increase of approximately \$2 million.

Routine operation and maintenance costs for the hybrid system would include chemical treatment required. There is routine maintenance required for the fans, motors, and gearboxes. The finned tubes may need periodic cleaning and touchup, or repainting of the equipment and structure would be performed. Estimates for the operation and maintenance of the hybrid alternative is approximately \$300,000 per year.

### **3.5 COST OF ONCE-THROUGH COOLING IMPROVEMENTS**

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As part of the proposed project, Mirant intends to combine the intake for both Units 3 and 7 and construct a new outfall structure. To meet the requirements of both the existing Unit 3 and the new Unit 7, the intake structure would be constructed on the shoreline near the southern boundary of the plant site. The total intake cooling water flow would be 315,000 gpm. The proposed intake structure would be a 54.4 foot by 203.5 foot rectangular structure with the longer dimension parallel to the shoreline. There would be two pumpwells at the rear of the structure. Installed in each pumpwell would be two 50 percent capacity circulating water pumps (two 70,000 gpm and two 79,000 gpm respectively). One set of pumps will provide cooling water to unit 3 and the other set of pumps will provide the cooling water for Unit 7. The intake would consist of a series of parallel separation walls forming 16 flow chambers. Each chamber will have a trash rack, stop log (used to isolate a chamber for maintenance), and a fish screen. The cooling water would be pumped from the intake structure through reinforced concrete pipe to the steam turbine condenser and returned to be discharged to the bay. The cooling water from the new Unit 7, as well as the existing Unit 3, would be discharged back to San Francisco Bay using four parallel multiport diffusers. The proposed multiport diffuser design would consist of two 200-ft long diffusers at the terminal ends of 900 foot-long discharge pipes used for each of Units 3 and 7, in depths of approximately 25 feet.

The capital costs estimate for the once through design has been developed for the above described design and includes costs for dredging and excavation, sheet piling, dewatering, placement of piles, placement of concrete structures, procurement of pumps, screens, trashracks, reinforced concrete pipe, offshore piping, stabilization fabric, and marine mattress. The costs additionally include miscellaneous materials and

equipment, erection, indirects, fees and profit. The total estimated cost for the once-through cooling system is \$25,109,800. Table 5 provides a breakdown of these costs.

**Table 5**  
**Capital Cost Estimate Once-through Cooling**

Item	Cost Estimate
Equipment	\$7,590,800
Bulk mat'l & misc. small equipment	3,528,000
Installation	7,080,000
Indirects and Fees	6,911,000
Total Cost	\$25,109,800



**POTRERO UNIT 7 COOLING OPTIONS Plate 1**  
**Dry Cooling Alternative One – Site Plan**  
(Not to Scale)

PLATE NOT AVAILABLE ON WEBPAGE

**POTRERO UNIT 7 COOLING OPTIONS Plate 2**  
**Dry Cooling Alternative One – Elevations**  
(Not to Scale)

PLATE NOT AVAILABLE ON WEBPAGE

**POTRERO UNIT 7 COOLING OPTIONS Plate 3**  
**Dry Cooling Alternative Two – Site Plan**  
(Not to Scale)

PLATE NOT AVAILABLE ON WEBPAGE

**POTRERO UNIT 7 COOLING OPTIONS Plate 4**  
**Dry Cooling Alternative Two – Elevations**  
(Not to Scale)

PLATE NOT AVAILABLE ON WEBPAGE

**POTRERO UNIT 7 COOLING OPTIONS Plate 5**  
**Wet/Dry Cooling Alternative – Site Plan**  
(Not to Scale)

PLATE NOT AVAILABLE ON WEBPAGE

**POTRERO UNIT 7 COOLING OPTIONS Plate 6**  
**Wet/Dry Cooling Alternative – Elevations**  
(Not to Scale)

PLATE NOT AVAILABLE ON WEBPAGE

## **4 ENVIRONMENTAL ANALYSIS OF COOLING OPTIONS**

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### **4.1 AIR QUALITY**

#### **Introduction**

Air pollutant emissions result from the construction and operation of any type of cooling tower. Construction emissions of concern are those from equipment exhaust and fugitive dust, while operational impacts include particulate matter (PM10 and PM2.5) from the cooling tower drift. This section identifies the potential air pollutant emissions and air quality impacts of using dry cooling or hybrid cooling systems.

#### **Air Emissions and Impacts of Dry Cooling**

Emissions from the construction of the dry cooling tower would be different than from the construction of the proposed once-through cooling system. Additional sections of the project site would be disturbed for the cooling towers and the laydown area(s) may have to be larger to store and/or prepare the air-cooled radiator components prior to installation. Grading and construction equipment would be required to prepare the site and install the dry cooling tower. The additional soil disturbance and equipment activity would result in increased fugitive dust and vehicle exhaust emissions. However, these emissions are short-term impacts because they occur only during project construction.

Air impact modeling for construction of the proposed project included calculating project contributions to existing violations of the State 24-hour PM10 standard. The increased construction activity for an air-cooled system would increase the project's contribution to local PM10 levels relative to the proposed project, increasing the short-term and potentially unavoidable construction air impacts. Implementation of staff's proposed construction mitigation would ensure that this contribution would be less than significant.

No additional emissions would be created by the air-cooled system itself, but the operation of the system could change the impact of the PM10 and PM2.5 emissions that are created by the project. As the air is moved over the coils, PM10 and PM2.5 suspended in the ambient air and from the ground surface would be resuspended in the atmosphere. Since these PM emissions would not be "new" emissions, and average emission rates vary significantly and seasonally, evaluating those impacts and mitigating them, if necessary, would be difficult.

The Applicant has argued that power plant performance penalties associated with air-cooled condensers (ACCs), compared to the proposed once-through cooling system, would result in additional air pollutant emissions from required additional fuel firing. The performance penalties include increased heat rates and parasitic loads. However, these potential changes in air emissions are highly speculative in California's competitive electricity market. The proposed project will operate as a merchant plant. The owner is not under contractual obligations to provide the proposed capacity in the immediate region. Furthermore, the project owner could choose to generate the "lost" capacity at another company plant or buy capacity on the open market throughout the

western system, rather than generating it at the Potrero project. The displaced capacity could be from an emissionless hydropower or nuclear plant, or from a coal plant in Wyoming. Therefore, the emission changes from power plant performance degradation due to air-cooling cannot be tied to the proposed project.

### **Air Emissions and Impacts of Hybrid Cooling**

Construction of a hybrid cooling system would likely produce both construction equipment exhaust and fugitive dust emissions similar to those associated with constructing the dry cooling option. However, compared to the dry cooling option, there would be additional fugitive dust and construction equipment exhaust impacts due to the construction of a pipeline for bringing cooling water to the site. Air impact modeling for the proposed project's calculated contributions to existing violations to the State 24-hour PM10 standard. The increased construction activity for a hybrid cooling system would increase the project's short-term contribution to local PM10 levels relative to the proposed project, increasing the short-term and potentially unavoidable construction air impacts. With the implementation of the staff proposed construction mitigation, staff believes that this contribution would be less than significant.

During operation of the hybrid cooling alternative, there would be PM emissions from the cooling tower drift. The amount of PM is proportional to the amount of drift and the total dissolved solids (TDS) in the circulating water. For the hybrid cooling system with a circulating water flow rate of 148,000 gallons per minute (gpm) and a drift of 0.0005%, the gpm of drift and lbs/hr of PM10 emissions can be calculated. Using the recirculation water's TDS content of approximately 7,000 ppm (estimated by the Applicant), the PM10 emissions of the hybrid cooling tower are estimated as follows:

$$148,000 \text{ gpm} \times 0.0005\% = 0.74 \text{ gpm of drift}$$

$$0.74 \text{ gpm} \times 8.34 \frac{\text{lb}}{\text{gal}} \times 7000 \frac{\text{ppm TDS}}{10^6} \times 60 \frac{\text{min}}{\text{hr}} = 2.59 \frac{\text{lb}}{\text{hr}} \text{ of PM10 drift}$$

$$\frac{2.59 \frac{\text{lb}}{\text{hr}} \times 8760 \frac{\text{hr}}{\text{yr}}}{2000 \frac{\text{lbs}}{\text{ton}}} = 11.34 \frac{\text{tons}}{\text{year}} \text{ of Cooling Tower PM10}$$

The annual PM10 emissions from a hybrid cooling tower can vary with drift eliminator efficiency, make-up water TDS, allowable tower TDS, and size of the wet system. The PM10 emissions from cooling tower drift would be required to be mitigated by emission reduction credits.

As with the ACC system, any potential or actual power plant performance penalties compared to the proposed project will not result in air emissions that must be tied to the project.

Because any PM10 emissions increases at Potrero would be required to be mitigated, impacts would be less than significant with the operation of a hybrid cooling system.



## **Air Emissions Mitigation**

### **Construction**

The implementation of the staff's Conditions of Certification regarding construction emissions would address and mitigate any potential impacts from increases in emissions from the construction of the once-through or alternative cooling system options to a less than significant level.

### **Operation**

Any operational air emissions increases at Potrero would be modeled to define impacts and then mitigated or offset, as appropriate.

### **Conclusion for Air Quality**

Staff believes that the construction of the dry or hybrid cooling systems described above would cause a potential short-term and unavoidable PM10 impact to the environment. Staff also believes that staff's proposed Conditions of Certification (see **Air Quality** FSA section) would minimize emissions, and mitigate the impacts to a less than significant level.

Any potential or actual power plant performance penalties associated with the dry or hybrid cooling systems compared to the proposed project would not result in air emissions that must be tied to the project.

Also, any air emissions increases at Potrero would be modeled for impacts and mitigated or offset, as appropriate. Therefore, there would not be any significant air emissions impacts with the operation of the dry or hybrid cooling systems.

## **4.2 BIOLOGICAL RESOURCES – AQUATIC**

### **Introduction**

The Potrero Power Plant (Potrero PP) is located along the western shore of central San Francisco Bay, the largest estuary on the Pacific coast of the United States. Bay waters in the vicinity of Potrero PP support diverse assemblages of aquatic invertebrates and fishes, as well as resident and migratory water birds and marine mammals. Resources of particular interest in the waters near Potrero PP include Dungeness crab and Pacific herring, species of commercial importance. Pacific herring lay their adhesive eggs on hard substrate in the vicinity of Potrero PP. Sensitive fish species that may occur in the vicinity of the Potrero PP include green sturgeon, longfin smelt, Chinook salmon, and steelhead. Invertebrates and forage fish abundant in the waters near Potrero PP, such as Pacific herring and northern anchovy, provide the base of the food web for many higher-level predators including salmonids, sharks and rays, seabirds, and marine mammals.

### **Aquatic Biological Resources Impacts of Once-Through Cooling**

In order to evaluate the impacts of dry and hybrid cooling systems at Potrero, the potential impacts of the proposed project (with once-through cooling) are summarized

here for comparison. In contrast to the dry or hybrid cooling alternatives, once-through cooling for Unit 7 could result in several potentially significant impacts to aquatic biological resources. Construction of the new combined intake structure for Unit 7 and Unit 3 would result in a permanent loss of about 0.24 acres of aquatic habitat. About 0.15 acres of the habitat (covering a linear distance of about 200 feet of shoreline) that would be permanently lost is concrete rubble that supports a relatively depauperate rocky intertidal community of barnacles, mussels, rock jingles, shore crabs, and algae. The remaining 0.09 acres that would be lost is shallow subtidal soft bottom habitat that supports a relatively diverse invertebrate assemblage dominated by nematode, oligochaete, and polychaete worms. In addition to loss of the benthic habitats where the fill for the intake structure would be placed, the entire water column would also be permanently lost. The water column above these areas provides habitat for many species of fish, including Pacific herring, Chinook salmon, steelhead, and northern anchovy. Because San Francisco Bay is a unique estuarine ecosystem that supports many sensitive species, permanent loss of Bay habitat is considered a significant adverse impact.

Construction of the new discharge structure of Unit 7, as well as a similar outfall structure for Unit 3, would result in the replacement of natural soft bottom Bay habitat by approximately 3.2 acres of artificial structures. Construction of these submerged structures would not preclude the use of Bay waters by species associated with the water column, and the structures themselves would provide additional habitat for hard bottom species and substrate for the deposition of herring eggs. Construction of the outfalls would result in the replacement of natural Bay bottom with artificial habitat. The construction of numerous piers, jetties, pipes, and other structures has resulted in a substantial cumulative loss of natural Bay soft bottom. Thus, the proposed new outfalls would add to cumulative losses of natural habitat in San Francisco Bay.

As mitigation for the loss of surface area and volume of bay water due to this fill, the Applicant has discussed with the Port of San Francisco and the Bay Conservation and Development Commission staff the removal of the derelict Wharf 5 in the Pier 70 vicinity. Removal of artificial structures in the Bay may provide adequate mitigation for the proposed fill because removal of structures would be in-kind mitigation for the placement of artificial structures. However, the details of this proposed mitigation have not yet been specified.

**Entrainment.** The once-through cooling system for Unit 7 would circulate up to 227 million gallons per day (mgd) of Bay water through the cooling water system. The use of Bay water for Unit 7 has the potential to approximately double the 226 mgd currently permitted for the once-through cooling system of Unit 3. Because the number of larval fishes and planktonic invertebrates sucked through the cooling water system is directly proportional to the volume of water that passes through the system, once-through cooling for Unit 7 could approximately double the losses to entrainment of Unit 3, resulting in the additional loss of many million larval fishes, fish eggs, larval invertebrates, zooplankton, and phytoplankton. These small planktonic organisms form the base of pelagic food chains in the Bay. Because San Francisco Bay is a unique estuarine ecosystem that has been severely impacted by human activities, this loss in aquatic resources would be considered a significant adverse impact that could have a variety of adverse effects on the aquatic ecosystem. For example, native aquatic

species in San Francisco Bay have been devastated by opportunistic, non-native species such as the Asian clam and the European green crab. Because the intake will crop the larvae of native and non-native species indiscriminately, and because invasive species generally have the ability to out-compete native species, the loss of larvae will probably favor the continued invasion of non-native species. Within 2 years following its introduction, the Asian clam spread throughout the estuary where it reached densities at some sites of over 10,000 individuals per square meter. In addition, the National Marine Fisheries Service (NMFS) has expressed concern about the loss of prey for juveniles of listed salmonids (NMFS 2001). The Applicant has not proposed mitigation for the entrainment losses.

The Applicant is currently conducting a year-long study to analyze the effects of entrainment by the combined Unit 3 and Unit 7 intake. Fish larvae that would be entrained in the greatest numbers include: unidentified gobies, yellowfin goby, Bay goby, Pacific herring, northern anchovy, and white croaker. The yellowfin goby is an introduced species. The other species subject to a substantial amount of entrainment are native to San Francisco Bay. Preliminary analysis based on six months of data suggests that entrainment would not result in a decline of any fish or invertebrate species. However, populations of some species fluctuate in San Francisco Bay and there may be years when entrainment effects are greater than indicated in the analysis.

**Impingement.** Fishes and mobile invertebrates would also be lost by impingement at the combined Unit 3 and Unit 7 intake. The number of organisms impinged is related to several factors, including the volume of water passed through the intake and the design of the intake. The Unit 7 project includes replacement of the existing Unit 3 intake with a new combined Unit 3 and Unit 7 intake. The new intake has several features designed to reduce impingement. With these features, impingement losses at the new intake may be reduced compared to losses at the existing intake.

The approach velocity would not exceed 0.4 feet per second. Many adult fishes can escape impingement at intake velocities below 0.5 feet per second. However, the approach velocity still may be too great to insure the safety of smaller salmonids (< 60 millimeters in length) that may be found in the project area (NMFS 2002). The NMFS recommends that to protect smaller salmonids, the approach velocity of the intake should not exceed 0.33 feet per second.

The proposed new combined Unit 3 and Unit 7 intake would have a continuously rotating inclined screen design. These screens are expected to reduce the amount of debris buildup in front of the intake, which would reduce the number of organisms trapped in debris and allow more juvenile and adult organisms to avoid impingement (SECAL 200a, AFC page 8.2-13). The Applicant also proposes to reduce impingement losses by implementing a fish return system equipped with a low-pressure spray wash. It is not clear to what extent fishes returned to the Bay with this low-pressure spray wash system would survive. Some may be injured in the process. The organisms with hard exoskeletons such as small shrimps and crabs would be most likely to survive impingement. More fragile organisms such as juvenile fishes likely would not survive impingement.

It is not known at this time to what extent these design improvements would offset the greater flow from the additional cooling water for Unit 7. The actual impacts of impingement at the new intake cannot be determined until the new intake is constructed and impingement of aquatic organisms is documented.

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**Thermal Discharge.** The discharge of heated effluent from the once-through cooling system may have adverse impacts on aquatic resources. The existing discharge sometimes results in a temperature elevation at the shoreline that is 10°F above ambient (SECAL 2000b, AFC Supplement Figures 8.2-4 through 8.2-6). Elevated temperatures from the plant's existing shoreline discharge have been observed to be associated with noticeable changes in the species composition and abundance of intertidal and subtidal algae in the immediate vicinity of the discharge. However, these temperature elevations have been observed to have little effect on invertebrates or the distribution of fishes (SECAL 2000a, AFC pp. 8.2-16). The existing discharge also may have an adverse effect on the development of herring eggs deposited on structures within the area contacted by the discharge plume.

Although the Unit 7 project would result in a greater discharge of heated effluent, the new combined Unit 7 and Unit 3 outfalls, which would have long diffuser sections discharging offshore, are expected to reduce the extent of the thermal plume. The thermal plumes from the new outfalls would not contact the shoreline. Therefore, the construction of a once-through cooling system for Unit 7 with new Unit 7 and Unit 3 outfalls may reduce some of the existing thermal impacts. The diversity and abundance of intertidal and subtidal algae near the existing intake would be expected to increase. Potential thermal impacts to herring eggs also would be reduced because the new thermal discharge is not expected to contact the shoreline or the bottom. With the new outfalls, thermal impacts to herring eggs would only occur if the herring laid their eggs on the diffuser nozzles.

Although shoreline impacts would be reduced with the new Unit 3 and Unit 7 outfalls, the thermal discharge would affect habitats farther out in the Bay than the existing discharge. The National Marine Fisheries Service (NMFS) and the California Department of Fish and Game (CDFG) have expressed concern that the discharge plumes from the proposed diffusers may have significant adverse impacts on listed salmonids (J. Dillon, NMFS personal communication 2001; M. Rugg, CDFG, personal communication, 2001). The project area is within Designated Critical Habitat for the Federal Threatened Central California Coast Evolutionarily Significant Unit of steelhead. Steelhead and Chinook salmon are more common in the offshore areas where the proposed new outfalls will be located than along the shoreline areas currently affected by the Unit 3 discharge. Therefore, moving the outfalls farther offshore would increase the chances that salmonids would come into contact with the thermal plume. Temperature rises exceeding 4°F are expected to be limited to the area immediately above each diffuser port and would not extend along the entire diffuser section (Mirant 2001). An estimate of the maximum volume of water that would exceed 4°F is 100,000 cubic feet. Thus, impacts to listed salmonids of the thermal plumes from the proposed outfalls are unlikely, but cannot be discounted entirely. The NMFS has expressed concern about potential water column impacts of the proposed discharge to juveniles of listed salmonids (NMFS 2001). Juvenile salmonids are not strong swimmers and will move with the tide. While adult salmonids should be able to escape the heated discharge plume with only short-term exposures, juvenile salmonids, which may be swept into the plume, may not be able to escape. The initial vertical velocity of the discharge is identified as 14 feet per second. Juvenile salmonids may be exposed to the effects of elevated water temperatures, and may be disoriented and pushed to the surface by the discharge plume. Disorientation and transport to the surface may result in increased exposure of juvenile salmonids to avian predators and larger fishes.

### **Aquatic Biological Resources Impacts of Dry Cooling**

Dry cooling would not require the construction of any structures in Bay waters and would involve no intake of Bay waters and no discharges to the Bay. Therefore, the dry cooling alternative would have no impacts to the aquatic biological resources of San Francisco Bay. Replacement of the proposed once-through cooling system with a dry cooling system for Unit 7 would eliminate potentially significant impacts of the proposed once-through cooling system to aquatic resources. These significant impacts include substantially increased loss of planktonic organisms by entrainment in the intake and

the potential for adverse effects of the thermal discharge to listed salmonids. Fill of San Francisco Bay waters is considered a significant but mitigable impact.

The existing Unit 3 once-through cooling system would continue to operate as it does presently. Proposed improvements to the Unit 3 system, which would likely reduce existing thermal impacts along the shoreline, and may reduce impingement at the intake, would not occur.

The potential benefits to aquatic resources of replacing the Unit 3 intake would not be likely to offset the impacts of the additional entrainment from the proposed construction of a once-through cooling system for Unit 7, because entrainment would reduce the base of the pelagic food web for organisms throughout the northern portion of South Bay and the southern portion of Central Bay and may have other effects, such as promoting the proliferation of introduced species, on the entire ecosystem. On the other hand, the reduction in thermal impacts of the Unit 3 intake would affect the small area of shoreline in the immediate vicinity of the existing discharge. It is not known to what extent the new intake will reduce impingement. A total of 55,611 fishes and 262,867 invertebrates were impinged at the existing intake during a 1978 to 1979 study (SECAL 2000a, AFC Appendix G page 78). At best, the new intake might reduce impingement by some percentage of this total.

#### **Aquatic Biological Resources Impacts of Hybrid Cooling**

Hybrid cooling would not require the construction of any structures in Bay waters and, the design considered would involve no intake of Bay waters and no discharges to the Bay. Therefore, the hybrid cooling alternative, like the dry cooling alternative, would have no impacts to the aquatic biological resources of San Francisco Bay.

As discussed above, implementation of a hybrid cooling alternative for the Unit 7 project would eliminate potentially significant impacts, including Bay fill, entrainment, and thermal impacts to listed salmonids, that would occur if the proposed once-through cooling system for Unit 7 were constructed. However, potential benefits to some aquatic resources from a new combined Unit 3 and Unit 7 intake and an offshore Unit 3 outfall would not occur. These benefits include a reduced area affected by the thermal plume and, possibly, reduced impingement.

#### **Conclusion for Aquatic Biological Resources**

Neither the dry cooling alternative nor the hybrid cooling alternative would have any direct impacts to aquatic resources.

With either the dry cooling or hybrid cooling alternative, proposed improvements to the Unit 3 cooling water system that are part of the Unit 7 once-through cooling system design would not occur. The proposed improvements to the existing Unit 3 intake and discharge may result in benefits to aquatic resources. The proposed new Unit 3 outfall would reduce the extent of the thermal plume. The proposed design of the new combined Unit 3 and Unit 7 intake may reduce impingement compared to the existing Unit 3 intake, although the increased flows could offset any reductions resulting from the improved design. Because these improvements would benefit a small area of shoreline and may not substantially reduce impingement, they likely would not compensate for the

loss of productivity from the entrainment of approximately double the number of planktonic organisms and the possible adverse effects to the San Francisco Bay ecosystem as a result of this loss.

In conclusion, dry cooling or hybrid cooling for Unit 7 would result in fewer impacts to aquatic resources than a once-through cooling system.

### **4.3 BIOLOGICAL RESOURCES – TERRESTRIAL**

#### **Introduction**

Two dry cooling alternatives and one hybrid-cooling alternative are evaluated with respect to the proposed once-through cooling method to determine their relative effects on terrestrial biological resources. Plant communities within one mile of the Potrero site consist primarily of disturbed non-native vegetation and no sensitive species are present. Most of the shoreline in this area has been modified with structures for terminal shipping or stabilized with rock or concrete. Prior to this development, the proposed power plant site and surrounding area was likely dominated by grassland, coastal scrub, and marsh vegetation.

The proposed Potrero Power Plant Unit 7 Project would be an addition to existing generating facilities. Unit 7 would occupy approximately 6.5 acres located in the south-central portion of the 20-acre plant site between the existing substation and power plant facilities. There is no vegetation located at the proposed power plant site and construction laydown area. A small strip of vegetated area approximately 15 feet wide between the Mirant property and the rip-rap along the shoreline has been appropriately described in the Application for Certification (AFC) as disturbed vegetation dominated by non-native species.

In the evaluation of the proposed project (including once-through cooling), four potential impacts were evaluated: (1) loss of sensitive species or their habitats; (2) bird collisions with new stacks; (3) noise effects on terrestrial wildlife; and (4) increases in nitrogen and sulfur deposition rates due to increases in plant emissions. It was concluded that all of these potential impacts of the proposed project to terrestrial biological resources were less than significant. These same impacts are evaluated below for the dry cooling and hybrid cooling alternatives relative to the proposed once-through cooling technology.

#### **Terrestrial Biological Resources Impacts of Dry Cooling**

Dry cooling would require the use of additional land (269 feet x 192 feet) for the air-cooled condensers (ACCs), result in additional noise from fans, and result in an increase in air emissions due to the reduction in efficiency. However, there are no sensitive terrestrial species or habitats within the project site or construction laydown area that would be affected by either the additional land requirements or any increase in noise levels. Neither do the dry cooling alternatives alter the evaluation of potential bird collisions with exhaust stacks. It should also be noted that while additional land space would be required within the existing Potrero property, there would be no shoreline disturbance from construction of new cooling water intake/outfall structures if dry cooling were used instead of the proposed once-through cooling technology.

With respect to potential bird collisions, the ACCs are about 108 feet high, far below the heights of 500 to 650 feet that are known to pose a bird collision threat (Goodwin 1975; Maehr et al. 1983; Weir 1974; Zimmerman 1975). Therefore, this alternative would not result in a significant increase in bird collisions.

The potential effects of increased air emissions on increased nitrogen (N) and sulfur (S) deposition rates at sensitive receptors were estimated for the Potrero project with once-through cooling. Under that operating scenario, it was determined that the impacts from the proposed project would be less than significant relative to other sites where the relationship between emissions, N and S deposition, and ecosystem level changes had been studied. The N deposition rate contributed from the Potrero project at San Bruno Mountain (the nearest sensitive receptor) was estimated to be 0.10 kg/ha-y N. This value is far less than the level of 10 to 15 kg/ha-y N deemed significant in Weiss's study (Weiss, 1999) south of the San Francisco area. This study evaluated impacts of N deposition on alteration of habitat suitability for the Bay checkerspot butterfly, a federally listed Endangered species. For dry cooling, the analysis of air emissions indicates that through offsets and/or operational adjustments emissions would be similar to those of the once-through cooling design, and therefore, the effect would still be less than significant. There would be no difference between the two dry cooling alternatives in this respect.

### **Terrestrial Biological Resources Impacts of Hybrid Cooling**

With respect to hybrid cooling, some additional land (491 feet x 50 feet) would be needed relative to once-through cooling for the air-cooled condensers and the reclaimed water supply and return pipelines. The land needed for the condensers would be entirely located within the plant property in an area absent of vegetation. The pipelines would follow existing roads or utility easements that are absent of native vegetation. An underground boring, in addition to that required for the transmission line, would be needed to cross Islais Creek. However, like the transmission line boring, directional boring will enter and exit approximately 180 feet from the channel outside of the vegetated strips along both banks, although the drilling area may extend to 170 feet from the channel. The patches of vegetation that exist among the rip rap along the banks provides some resting area for waterfowl that use the creek; however it does not contain any sensitive plant or animal species. During construction there will be a disturbance to waterfowl that use this area; however this impact will be temporary and will not affect any threatened or endangered species. Therefore, significant impacts to biological resources from the additional boring, including threatened and endangered species, are not expected to occur. The underground borings at the Creek crossing would not require a streambed alteration permit from the California Department of Fish and Game because the creek is a soft-bottomed channel that has been cut off upstream and is no longer a creek per se, but rather an estuary inlet that is not covered by this permit.

There would also be additional noise (intermediate in level between the proposed once-through and dry cooling alternatives). However, as previously noted for dry cooling, additional noise would not cause impacts to sensitive terrestrial species or their habitats, which are absent from the project area.



With respect to potential bird collisions, the cooling towers for hybrid cooling are about 70 feet high, far below the heights of 500 to 650 feet that are known to pose a bird collision threat (Goodwin 1975; Maehr et al. 1983; Weir 1974; Zimmerman 1975). Therefore, this alternative would not result in a significant increase in bird collisions.

N and S deposition rates for this alternative would potentially be less than those for dry cooling and slightly more than those for once-through cooling, but still less than significant. This alternative introduces a source of salt deposition from cooling tower drift that would ostensibly occur within a narrow radius and not reach sensitive terrestrial receptors at San Bruno Mountain, approximately 4.5 miles southwest of the project site. For hybrid cooling, the analysis of air emissions indicates that through offsets and/or operational adjustments emissions would be less than significant; therefore, no impacts on terrestrial biological resources would occur.

### **Conclusion for Terrestrial Biological Resources**

Relative to the proposed once-through cooling technology, the two cooling options (dry cooling and hybrid cooling) would require more land within the property, and would produce slightly greater noise and slightly more emissions. However, all cooling options (including once-through cooling) would affect terrestrial biological resources similarly, and would not cause significant impacts to terrestrial biological resources.

## **4.4 CULTURAL RESOURCES**

### **Introduction**

Impacts to subsurface cultural resources (prehistoric and historic archaeological sites) could result from construction of facilities necessary for dry cooling or hybrid cooling. Excavation and grading for the foundations of the cooling structures (necessary for both dry cooling and hybrid cooling) and excavation for installation of the water pipeline (for hybrid cooling) could expose and disturb as yet unidentified archaeological material.

### **Cultural Resources Impacts of Dry Cooling**

Potential subsurface cultural resources from the historical period within the power plant property were identified in the cultural resources section of the Staff Assessment. Historical research indicated that gunpowder magazines and an associated dwelling were located somewhere within the power plant property. An archaeological test excavation for a previously proposed power plant expansion project revealed a portion of the foundation of one of the powder magazines within the current power plant property. If the proposed location for the dry cooling facility is on artificial fill placed in the former bay, there is little potential for encountering subsurface cultural resources.

The proposed location of Dry Cooling Alternative One is in the southeastern part of the property near the bay, so it is likely that this location is underlain by fill. However, if the location is not underlain by fill, grading and excavation for construction of the dry cooling facility could encounter cultural resources from the historical period. Such is the situation for the location of Dry Cooling Alternative Two. Dry Cooling Alternative Two may not be underlain by fill and therefore cultural resources could be encountered at that location during grading. If resources were encountered during construction that were determined eligible for the California Register of Historical Resources (CRHR),

construction of the dry cooling facility could materially impact cultural resources that are potentially eligible for the CRHR. Mitigation for these potential impacts is presented in the **Cultural Resources** section of this FSA.

Compared to once-through cooling, a somewhat larger area within the power plant property would be subject to construction impacts because of the addition of the dry cooling structure, resulting in a somewhat larger potential to encounter and impact subsurface cultural resources.

### **Cultural Resources Impacts of Hybrid Cooling**

Potential impacts to cultural resources resulting from the hybrid cooling alternative within the power plant property would be similar to the dry cooling alternative, although the hybrid cooling structure would be somewhat smaller than the dry cooling structure, resulting in somewhat less ground disturbance. If the proposed location for the hybrid cooling facility is on artificial fill placed in the former bay, there is little potential for encountering subsurface cultural resources. Given that the proposed location is in the southeastern part of the property near the bay, it is likely that this location is underlain by fill. However, if the location is not underlain by fill, grading and excavation for construction of the hybrid cooling facility could materially impact cultural resources that are potentially eligible for the CRHR. Mitigation for these impacts (such as that proposed in Conditions of Certification for Cultural Resources) would reduce impacts to less than significant levels.

The hybrid cooling alternative requires construction of a water pipeline in city streets between the power plant property and the Southeast Water Pollution Control Center (SWPCP) located approximately one mile southwest of the power plant property near the intersection of Jerrold Avenue and Phelps Street. Construction of the pipeline would require trenching, which has the potential to impact subsurface cultural resources from both the historic and prehistoric periods. Buried resources from the historic period could include buried portions of the Western Pacific Railroad Wharf (located at 25<sup>th</sup> Street), as well as other as yet unidentified historical resources. Because a portion of the proposed pipeline alignment would cross original land areas (rather than fill placed in former bay/estuary), there is also the potential to encounter subsurface prehistoric cultural resources. The area south of Islais Creek has a high potential for prehistoric cultural resources because Native American settlements were often located where freshwater creeks emptied into the bay. If resources were encountered during construction that were determined eligible for the CRHR, construction of the hybrid cooling facility and the water pipeline could materially impact cultural resources that are potentially eligible for the CRHR.

Compared to once-through cooling, a somewhat larger area within the power plant property would be subject to construction impacts because of the addition of the hybrid cooling structure, resulting in a somewhat larger potential to encounter and impact subsurface cultural resources. However, the most important aspect of the hybrid system is the need to construct a one-mile long water pipeline. Although no subsurface cultural resources have yet been identified along the pipeline route, pipeline construction increases the potential to impact subsurface cultural resources that would

not be affected by the proposed project. Conditions to require testing prior to construction would help identify any subsurface resources.

### **Conclusion for Cultural Resources**

The proposed Unit 7 Project and Dry Cooling Alternative One are similar in their potential impact on subsurface cultural resources, although Dry Cooling Alternative One would require somewhat more ground disturbance within the power plant property. The hybrid cooling alternative has significantly greater potential to impact subsurface cultural resources because of the additional ground disturbance necessary to construct the one-mile long water pipeline. Dry Cooling Alternative Two also has greater potential to affect sub-surface cultural resources because it is likely located over an area that is not underlain by fill.

Feasible mitigation measures for all alternatives consist of testing prior to construction to help identify buried subsurface resources, followed by avoidance (if possible) or data recovery of any resources encountered prior to, or during, construction. These mitigation measures would reduce the impacts to cultural resources to less than significant levels. Since it is always preferable to avoid and preserve cultural resources (rather than impact them and mitigate impacts through data recovery), the alternatives that have a lower potential to encounter subsurface cultural resources are preferred.

## **4.5 HAZARDOUS MATERIALS MANAGEMENT, WORKER SAFETY, AND FIRE PROTECTION**

### **Introduction**

As possible alternatives to the once-through cooling system proposed for the Potrero Unit 7 Power Plant, BCDC has requested information regarding impacts of dry and hybrid cooling technologies.

### **Hazardous Materials Impacts of Dry Cooling**

Dry cooling would not use the large volumes of water used in once-through cooling systems, in turn reducing the volume of chemicals (e.g., sodium hypochlorite) needed to control algae growth within the system (particularly in the condenser tubes). Thus, hazardous materials usage would decrease. However, the larger volume of piping (including seals, flanges, and valves) could result in oxygen entry into the system and therefore would require an increased use in oxygen scavengers to prevent corrosion and scaling. The Potrero Unit 7 Project is proposing to use aqueous hydrazine, an acutely toxic hazardous material, as an oxygen scavenger. The increased use of hydrazine for a dry cooling system could be significant. If dry cooling were selected, Conditions of Certification would need to be changed or modified to reflect the types and quantities of these hazardous materials. Staff has already recommended the use of a far safer alternative, carbohydrazide, as an oxygen scavenger. If the Applicant were to select this chemical, or if the Energy Commission requires its use, the overall use of hazardous materials with dry cooling would be the same or less than as with once-through cooling.

### **Hazardous Materials Impacts of Hybrid Cooling**

The hybrid cooling alternative would use larger volumes of water than the dry cooling options, but less than once-through cooling. Therefore, the amount of hazardous materials and the risk of accidental release for hybrid cooling would be somewhat less than with once-through cooling, but somewhat greater than with dry cooling.

### **Worker Safety and Fire Protection**

The risk to workers and the impacts on fire protection would not change significantly with any of the cooling technologies. This is mostly due to the generic nature of worker and fire protection required at a power plant licensed by the CEC.

### **Conclusion for Hazardous Materials Management, Worker Safety, and Fire Protection**

Staff does not consider the impacts from the cooling technologies discussed above to be significantly different, since rather minor differences in hazardous materials use would exist with any of the options. Because both the Applicant and staff have proposed mitigation measures or Conditions of Certification, the overall risk due to hazardous materials is approximately the same for all proposed cooling technologies. Staff concludes that the impacts to workers and fire protection are also similar with all cooling options.

## **4.6 LAND USE**

### **Introduction**

A project would be considered to have a significant effect on land use if the project would physically divide an established community, or conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project. A project would also have a significant impact on land use if it were to create unmitigated noise, dust, public health hazard or nuisance, traffic, or visual impacts. Because the cooling alternatives do not involve the construction of a physical linear barrier, they are not considered capable of physically dividing the community. Therefore, the following analysis focuses on consistency with applicable land use laws, ordinances, regulations, and standards (LORS), and potential impacts that could cause land use incompatibilities. Because land use compatibility impacts are largely based on other issue areas (noise, visual resources, etc.), the conclusions about potential land use compatibility impacts are derived from conclusions about significant impacts for other issue areas.

### **Land Use Impacts of Dry Cooling**

#### **Dry Cooling Alternative One**

In Dry Cooling Alternative One, the dry cooling facilities would be located in the southeastern corner of the Potrero PP site and would appear as a large elevated box-like structure approximately 108 feet high, which would be about the same height as the primary proposed Unit 7 structure that encloses the gas turbines, heat recovery steam generator, and steam turbine complex.

As noted in the **Land Use** section of the FSA, the project site is designated Heavy Industry in the San Francisco General Plan and zoned M-2 (Heavy Industry). According to the CCSF Zoning Administrator, a power plant and appurtenant facilities are permitted in this zone. The dry cooling facilities would require a large amount of space, but can be accommodated on the site without violating the development standards of the M-2 zone (height, setbacks, floor-area ratio, etc.). Therefore, this alternative would be consistent with applicable land use LORS.

Implementation of dry cooling technology would eliminate the need to construct the new Unit 7 intake/discharge cooling system structure in the bay. The proposed Unit 7 intake/discharge structure would require the Applicant to reach an agreement with the Port to construct and maintain the structure on Port lands. Additionally, construction of the intake/discharge structure would be classified as a "bay fill project" by the BCDC, thereby requiring a determination of consistency with relevant BCDC LORS and mitigation for loss of bay habitat. Both of these issues would be eliminated with the implementation of the dry cooling alternative. Consequently, with dry cooling the Applicant would not need to consult with the BCDC regarding bay fill nor with the Port regarding construction and/or operation of the Unit 7 intake/discharge structure.

Land use compatibility is determined by evaluating the effects a project would have on surrounding land uses. Land use incompatibilities can occur if a project's off-site impacts significantly affect neighboring uses in an adverse way. The dry cooling facility would be a major noise source, necessitating implementation of feasible mitigation in the form of a modified fan configuration to ensure that no significant change in ambient noise levels would occur. Due to its size, the dry cooling facility would also be visually prominent from various key observation points, even with mitigation. For these reasons, the dry cooling facility could have potentially significant visual impacts (see the **Noise** and **Visual Resources** sections of this analysis). As a result, this alternative has the potential to result in greater land use incompatibilities than the proposed project.

As described in the **Noise** section of this analysis, while the potential noise impacts of the dry cooling facility can be substantially reduced with feasible mitigation (modified fan configuration), the increase in ambient noise levels at the property line would exceed the level that staff uses as a threshold for significance. However, there are no adjacent sensitive receptors that would be exposed to these elevated ambient noise levels. As a result, no significant noise impacts are expected and no land use incompatibilities would occur due to elevated noise levels. As described in the **Visual Resources** section of this analysis, the facility's visual impacts would remain significant even with mitigation (Potential mitigation for visual impacts include landscaping; surface treatment of structures (color, texture, and limited design) to minimize visual intrusion, and contrast, and limitations on lighting.). Therefore, the implementation of Dry Cooling Alternative One would result in a potentially significant land use compatibility impact based on significant adverse effects related to visual resources. No other significant off-site effects capable of producing land use incompatibilities have been identified.

In conclusion, the only significant land use impact associated with this alternative would be potential land use incompatibilities based on significant visual impacts.

## **Dry Cooling Alternative Two**

The land use impacts of Dry Cooling Alternative Two would be similar to those described above for Dry Cooling Alternative One. The two alternatives are very similar except that with Dry Cooling Alternative Two, the cooling facilities would be located in the northwestern corner of the Potrero PP site, whereas with Dry Cooling Alternative One they would be located in the southeastern corner of the site. Use of dry cooling at Dry Cooling Alternative Two, would be consistent with applicable land use LORS (see discussion above for Dry Cooling Alternative One).

Implementation of dry cooling technology would eliminate the need to construct the new Unit 7 intake/discharge structure in the bay, in turn eliminating the need to consult with BCDC and the Port on this issue.

As described above for Dry Cooling Alternative One, the dry cooling facility would be a major noise source and would result in the construction of a visually prominent structure on the site. The location of Dry Cooling Alternative Two would significantly increase noise levels at properties west of the power plant site and substantial mitigation (in the form of re-designed fan configuration) would be required to reduce noise levels (see the **Noise** section of this analysis). With implementation of this mitigation, significant off-site noise impacts can be avoided. Therefore, no land use incompatibilities based on noise are expected. However, because the dry cooling facility would be a large and visually prominent structure, it would have a significant adverse impact on views from various key observation points (see the **Visual Resources** section of this analysis). The impacts on visual resources would remain significant even with mitigation. Thus, implementation of Dry Cooling Alternative Two would result in a significant land use compatibility impact based on significant adverse effects on visual resources. No other significant off-site effects capable of producing land use incompatibilities have been identified.

In conclusion, the only significant land use impact associated with this alternative would be potential land use incompatibilities based on significant visual impacts.

## **Land Use Impacts of Hybrid Cooling**

The hybrid cooling facilities would appear as a linear, box-like structure approximately 70 feet high, located west of the Unit 3 stack, adjacent to 23<sup>rd</sup> Street. This would be shorter than the primary proposed Unit 7 structure that encloses the gas turbines, heat recovery steam generator, and steam turbine complex. The hybrid cooling alternative would require the construction of a pipeline to bring cooling water to the site from the San Francisco Southeast Water Treatment Center, located approximately one mile southwest of the Potrero PP site.

As described in the **Land Use** section of the FSA, the Potrero PP site is located in an area zoned Heavy Industry (M-2). The power plant and appurtenant cooling facilities are permitted in this zone. The hybrid cooling facilities can be accommodated on the site without violating the development standards of the M-2 zone (height, setbacks, floor-area ratio, etc.). Therefore, this alternative would be consistent with applicable land use LORS.

Similar to the dry cooling alternatives, implementation of hybrid cooling technology would eliminate the need to construct the new Unit 7 intake/discharge cooling system structure. Consequently, the Applicant would not need to consult with the BCDC regarding bay fill nor with the Port regarding construction and/or operation of the Unit 7 intake/discharge structure. This is the same as with the two dry cooling alternatives addressed above.

The hybrid cooling facility would be a major noise source and, consequently, off-site noise impacts are possible. With mitigation (modified fan configuration), significant off-site noise impacts can be avoided (see the **Noise** section of this analysis). According to the **Visual Resources** analysis, the hybrid cooling facility would not result in any significant effects on views. No other significant off-site effects capable of producing land use incompatibilities have been identified. Therefore, no significant land use incompatibilities are expected to result from implementation of the Hybrid Cooling alternative.

In conclusion, the implementation of the hybrid cooling technology would not result in any new significant land use impacts. Therefore, no mitigation would be required.

### **Conclusion for Land Use**

From a land use perspective, the primary difference among the cooling technologies is their potential to result in land use incompatibilities. As indicated in the preceding evaluation, both of the dry cooling alternatives could result in significant land use compatibility impacts based on significant impacts to visual resources. The hybrid cooling alternative would not result in any new significant land use impacts.

All of the cooling alternatives discussed above would comply with applicable land use LORS. Similarly, the proposed project (utilizing once-through cooling with bay water) would also comply with applicable land use LORS.

An advantage shared by all of the cooling alternatives discussed above compared to the proposed project is the elimination of the need to construct a new intake/discharge cooling system structure in the bay. If a cooling alternative is selected that not does require construction of a new intake/discharge structure, CEC staff will consult with the BCDC to determine whether Conditions of Certification LAND-3, LAND-4, and/or LAND-5 would still be required. If the revised project does not involve any bay fill and nor any onshore modifications within BCDC's jurisdiction, it is possible that some or all of these conditions could be eliminated or substantially modified.

In conclusion, the proposed project and the hybrid cooling alternative are superior to the dry cooling alternatives due to avoidance of land use incompatibility impacts stemming from significant impacts to visual resources. However, from a land use perspective, the proposed project and the hybrid cooling alternative are not substantially different from each other. Both would be consistent with applicable land use LORS and neither would be expected to result in any significant land use incompatibilities. Therefore, neither the proposed project nor the hybrid cooling alternative would have a substantial advantage over the other, but both are more favorable than the dry cooling alternatives from a land use perspective because of the avoidance of potential land use incompatibilities.

## 4.7 NOISE

### Introduction

The use of either a dry or hybrid cooling system would introduce new noise sources to the proposed plant design. These noise sources consist of fans, motors, gearboxes, and, in the hybrid system, cascading water. The most significant noise sources would be the fans, which would be located relatively high on the system structures, although the hybrid system fans may be lower than the dry cooling system fans. Motors and gearboxes are typically located near ground level, and may be shielded by other components of the system. The sides of the cooling tower structure may significantly shield noise produced by cascading water.

The array of structures for both types of cooling systems may provide shielding of some units for receptors, depending on the receptor position. That is, one of the cooling towers or radiator units may block line of sight to some or all of the others, which would reduce the noise received from the shielded units. For receptors parallel to the array, each unit would contribute noise to the total noise exposure, with little or no shielding.

Any type of combined cycle power plant would introduce the possibility of high start-up noise levels due to the need to bypass HRSG-produced high-pressure steam to the condenser until it is of adequate quantity and quality to send to the steam turbine. For dry cooling systems, the high-pressure start-up steam would be ducted into the manifolds leading to the air-cooled condensers (ACCs). Silencers or other acoustical treatment may be required in the steam lines to ensure that noise due to this steam bypass does not exceed acceptable levels.

Noise level data used for this analysis were obtained for a baseline case and two options from GEA, a supplier of cooling equipment for power plants and similar industrial installations. The actual noise emissions of a given cooling system installation may vary from these values, depending upon final system configuration, but the values presented here are expected to be reasonably representative of typical installations.

### Noise Impacts of Dry Cooling

#### **Dry Cooling Alternative One**

In Dry Cooling Alternative One, the array of ACCs would be placed on the southeast portion of the project site. Thirty-five fan units are proposed. Two noise-reducing options were provided by GEA, which may be considered as potential noise mitigation measures. The reference noise levels and operational assumptions are presented in Table 3. The "Baseline Case" in **POTRERO UNIT 7 COOLING OPTIONS Table 3** is the configuration conceived of in Dry Cooling Alternatives One and Two (defined in Chapter 3). Options 2 and 3 are different fan configurations that would allow quieter operation.



**POTRERO UNIT 7 COOLING OPTIONS Table 3**  
**Cooling Fan Installation Operational Assumptions: Dry Cooling Alternatives**

Option	No. of Fans	Motor Ratings	Sound Level, dBA at 400 feet	Layout
1 (Baseline Case)	35	200 HP	65	269' x 192'
2	40	150 HP	59	300' x 188'
3	45	100 HP	51	338' x 188'

Given the design assumptions listed above, the noise levels due to the fan installations at the nearest receptors were predicted, based upon hemispherical spreading. The predicted noise levels at the nearest affected receptors are given by **POTRERO UNIT 7 COOLING OPTIONS Table 4**.

**POTRERO UNIT 7 COOLING OPTIONS Table 4**  
**Predicted Cooling Fan Noise Levels: Dry Cooling Alternative One**

Receptor	Distance, feet	Sound Level, dBA			
		Option 1 (Baseline Case)	Option 2	Option 3	Ambient
Nearest Property Line	30	87	81	73	54-62
Nearest Residences	1,700	52	46	38	47-51

The predicted values indicate that in the Baseline Case (Option 1), the fan noise levels would exceed the noise standards of the San Francisco Noise Ordinance<sup>10</sup> at the nearest property line as well as at the nearest residences. The fan noise levels at both locations would also exceed the 5 dBA L<sub>90</sub><sup>11</sup> increase, which staff uses as a threshold to determine whether project noise would result in a significant noise impact.

Noise mitigation would be required to achieve compliance with the LORS, and to ensure that no significant change in ambient noise levels would occur. Design Option 3 would have to be implemented as mitigation to achieve these objectives. Even in this case, the change in ambient noise levels at the property line would exceed the 5 dBA L<sub>90</sub> increase that staff uses as a threshold to determine whether project noise would result in a significant noise impact. However, there are no sensitive receivers at the property line, so no significant noise impacts would be expected.

<sup>10</sup> The City and County of San Francisco's Noise Ordinance presents a basic noise level criteria for most residential land uses (zoned R-1-D, R-1 and R-2) are that the average noise level caused by the source shall not exceed 50 dBA at nighttime (10 p.m. to 7 a.m.), or 55 dBA in daytime (7 a.m. to 10 p.m.), measured at the affected property line. The noise standards for industrial-zoned land are 70 dBA (M-1) and 75 dBA (M-2), any time. In the absence of specific noise standards, Section 2901.11 states that producing a noise level that exceeds the ambient noise level by 5 dBA or more when measured at the receiving property line is a violation of the Code.

<sup>11</sup> L<sub>90</sub> is the background noise level that is exceeded 90% of the time.

## Dry Cooling Alternative Two

Dry Cooling Alternative Two would place the ACC units approximately 900 feet west of the location proposed for Dry Cooling Alternative One. The relocation alone would significantly increase noise levels at the properties west of the power plant site. In addition, no shielding would be provided by the power plant itself, because the ACCs would be located near Illinois Street. As a result, this alternative would be expected to require substantially more extensive noise mitigation to achieve the City of San Francisco noise standards than would Dry Cooling Alternative One.

The noise levels assumed for Dry Cooling Alternative Two are the same as given by **POTRERO UNIT 7 COOLING OPTIONS Table 3**.

Given the assumptions detailed below, the noise levels due to the fan installations at the nearest receptors were predicted, based upon hemispherical spreading. The predicted noise levels at the nearest affected receptors are given by **POTRERO UNIT 7 COOLING OPTIONS Table 5**.

**POTRERO UNIT 7 COOLING OPTIONS Table 5**  
**Predicted Cooling Fan Noise Levels: Dry Cooling Alternative Two**

Receptor	Distance, feet	Sound Level, dBA			
		Option 1 (Baseline Case)	Option 2	Option 3	Ambient
Nearest Property Line	30	87	81	73	54-62
Nearest Residences	1,200	55	49	41	47-51

The predicted values indicate that, in the Baseline Case (Option 1), the fan noise levels would exceed the noise standards of the San Francisco Noise Ordinance at the nearest property line as well as at the nearest residences. The fan noise levels at both locations would also exceed the 5 dBA  $L_{90}$  increase, which staff uses as a threshold to determine whether project noise would result in a significant noise impact.

For Dry Cooling Alternative Two, noise mitigation in the form of a different fan design (see Table 3) would be required to achieve compliance with the LORS, and to ensure that no significant change in ambient noise levels would occur. Design Option 3 would be required to achieve these objectives, except that the change in ambient noise levels at the property line would exceed the 5 dBA  $L_{90}$  increase, which staff uses as a threshold to determine whether project noise would result in a significant noise impact. However, there are no sensitive receivers at the property line, so no significant noise impacts would be expected.

## Noise Mitigation for Dry Cooling

Additional noise reduction could be possible with the use of barriers or “super-low noise fans.” The super-low noise fans are reported to be substantially more efficient than low noise or conventional (propeller-type) fans, so that less additional energy is required. Super-low noise fans may reduce fan noise by up to 20 dBA.

Noise due to motors and gearboxes can be significantly reduced by enclosing or lagging the units. These measures are expected to be feasible.

The Applicant has stated that noise mitigation to achieve compliance with the City of San Francisco noise standard of 75 dBA at the property line could also be achieved by building noise barriers integral with the cooling tower arrays.

The predicted noise levels associated with the unmitigated dry cooling alternatives are significant in terms of both the LORS and the change in noise levels relative to the ambient noise environment. Mitigation measures for the nearest sensitive receptors are expected to be feasible for either of the dry cooling alternatives.

### **Noise Impacts of Hybrid Cooling**

#### **Operational Noise Impacts**

The array of cooling towers for the hybrid cooling system would be placed on the southeast portion of the project site. Ten cooling units are proposed. Staff developed working assumptions for this alternative using the data provided by GEA, adjusting for the use of 10 fans instead of 35. Similarly, staff estimated the effects of noise-reducing options to be the same as expected for the dry cooling alternatives. The reference noise levels and operational assumptions are presented in **POTRERO UNIT 7 COOLING OPTIONS Table 6**.

**POTRERO UNIT 7 COOLING OPTIONS Table 6**  
**Cooling Fan Installation Operational Assumptions: Hybrid Cooling Alternatives**

<b>Option</b>	<b>No. of Fans</b>	<b>Motor Ratings</b>	<b>Sound Level, dBA at 400 feet</b>	<b>Layout</b>
1 (Base Case)	10	200 HP	62	N/A
2	12	150 HP	56	N/A
3	13	100 HP	48	N/A

Given the assumptions listed above, the noise levels due to the fan installations at the nearest receptors were predicted, based upon hemispherical spreading. The predicted noise levels at the nearest affected receptors are given by **POTRERO UNIT 7 COOLING OPTIONS Table 7**.

**POTRERO UNIT 7 COOLING OPTIONS Table 7**  
**Predicted Cooling Fan Noise Levels: Hybrid Cooling Alternative One**

Receptor	Distance, feet	Sound Level, dBA			
		Option 1 (Baseline Case)	Option 2	Option 3	Ambient
Nearest Property Line	30	84	78	70	54-62
Nearest Residences	1,700	49	43	35	47-51

The predicted values indicate that, in the Baseline Case (Option 1), the fan noise levels would exceed the noise standards of the San Francisco Noise Ordinance at the nearest property line as well as at the nearest residences. The fan noise levels at both locations would also exceed the 5 dBA  $L_{90}$  increase that staff uses as a threshold to determine whether project noise would result in a significant noise impact.

Noise mitigation in the form of modified fan design would be required to achieve compliance with the LORS, and to ensure that no significant change in ambient noise levels would occur. Design Option 3 would be required to achieve these objectives. The change in ambient noise levels at the property line would still exceed the 5 dBA  $L_{90}$  increase that staff uses as a threshold to determine whether project noise would result in a significant noise impact. However, there are no sensitive receivers at the property line, so no significant noise impacts would be expected.

### **Noise Mitigation for Hybrid Cooling**

It is possible that additional noise reduction could be realized by the use of barriers or “super-low noise fans.” The super-low noise fans are reported to be substantially more efficient than low noise or conventional (propeller-type) fans, so that less additional energy is required. Super-low noise fans may reduce fan noise by up to 20 dBA.

Noise due to motors and gearboxes can be significantly reduced by enclosing or lagging the units. These measures are expected to be feasible.

Noise due to cascading water, though usually not significant due to its low noise level as compared to the noise produced by fans and other mechanical equipment, can also be reduced by ensuring that the water hits a sloped surface at the bottom of the tower.

The Applicant has stated that noise mitigation to achieve compliance with the City of San Francisco noise standard of 75 dBA at the property line could also be achieved by building noise barriers integral with the cooling tower arrays.

### **Construction Noise Impacts**

Since it would be necessary to bring cooling water to the site through a new pipeline, the hybrid cooling alternative would also have the potential for construction noise impacts. The new water line would connect to the San Francisco Southeast Water Treatment Center, about one mile southwest of the power plant site. The pipeline would

be constructed within city streets, which would introduce typical construction noise sources to the receptors along the route. The noise sources could include pavement breakers, compressors, and diesel-powered mobile equipment. The City of San Francisco Municipal Code would regulate noise levels and hours of operation of construction equipment.

### **Conclusion for Noise**

Of the three cooling options, the proposed once-through system would have the fewest potential noise impacts, as the only significant noise sources would be pumps and motors, which are relatively quiet as compared to the remainder of the equipment comprising the power plant.

The dry cooling option would produce the highest unabated noise levels, as there would be more fans than in the hybrid cooling system, and the baseline noise levels of the fans are higher than in the hybrid cooling system. Dry Cooling Alternative Two would place the fans substantially closer to potentially affected properties, and would require correspondingly greater noise mitigation than Dry Cooling Alternative One. Mitigation measures that would reduce these impacts to less than significant levels appear to be feasible for both dry cooling alternatives.

The wet/dry cooling option would produce significantly higher unabated noise levels than the once-through system, but the noise levels would be lower than for the dry cooling system. Mitigation measures appear to be feasible for the wet/dry cooling alternative.

## **4.8 PUBLIC HEALTH**

### **Introduction**

This section evaluates the health risks from operating the Potrero Unit 7 Project using dry and hybrid cooling technologies, and compares such risks with the cooling-related baseline risk from Unit 3, as currently operated using once-through cooling. The potential impacts addressed in this section are the cancer and non-cancer impacts from exposure to the project's non-criteria pollutants (or air toxics) for which there are no specific air quality standards. Such risks result mostly from inhalation exposure. The pollutants of concern in this regard are those from the project's combustion turbines, cooling structures, or equipment to be used for construction. The methods for assessing the cancer and non-cancer health impacts of such pollutants are presented in the FSA. Since staff considers the risk of cancer as the most sensitive measure of the potential for health hazards from specific sources of environmental pollutants, the relative impacts of these cooling technologies are assessed in terms of their respective cancer risk levels. The potential impacts of the companion criteria pollutants (for which there are specific air quality standards) are addressed in the **Air Quality** section, in terms of compliance with the applicable standards.

The air toxics of concern in this analysis would result from both construction and operation. Construction emissions include diesel exhaust and dust-related PM<sub>10</sub> on which there are adsorbed air toxics. Pollutants from operations include combustion by-products and air toxics from cooling tower drift.

### Health Impacts of Once-Through Facility Cooling

Since once-through cooling system is operated as a closed system, it does not allow for human inhalation exposures to the potentially toxic additives usually added to the utilized water to prevent bio-fouling and system corrosion. Therefore, as described in the **Public Health** section of this FSA, once-through cooling should not be seen as posing a significant health risk from the existing Unit 3 operations.

### Health Impacts of Dry Cooling

As noted in the **Air Quality** section, the additional construction activities from erecting a dry cooling structure would increase the dust-related PM10 emission whose impacts of concern in this analysis would result from the interaction of the toxic pollutants that might be adsorbed onto it. Such adsorption would be associated with specific soil contamination that must be mitigated before beginning construction. The requirements for ensuring such pre-construction mitigation are specified in the **Waste Management** section of the FSA and should be adequate for the proposed Unit 7 or any cooling alternatives that might be used.

The toxic health risks from all diesel equipment emissions would be minimized through implementation of the Conditions of Certification in the **Air Quality** section, which would also apply to construction of any cooling structures that might be used for the project.

The only other dry cooling-related toxic impacts of potential significance would be the emission increases from increased generation that might be considered necessary to counteract the loss in generation efficiency. Since such loss can easily be replaced at other generating facilities without increased power generation, staff does not consider the potential loss in efficiency as a significant factor in the assessment of health risks related to dry cooling. This means that dry cooling would be incapable of significantly increasing the 0.658 in a million cancer risk specified in the FSA for the proposed Unit 7 project. Staff regards this suggested cancer risk as less than significant.

### Health Impacts of Hybrid Cooling

Construction of a hybrid cooling system would generate the same diesel and dust emissions associated with construction of the dry cooling system. As with dry cooling, implementation of staff's proposed mitigation requirements would be adequate to reduce the cancer and non-cancer risks of concern. The implementation of Conditions of Certification is specified in the **Air Quality** and **Waste Management** sections of the FSA.

The other hybrid cooling-related impacts of potential concern would result from exposure to any toxic water constituents that would be emitted in the wet cooling phase. Such constituent emissions do not occur with once-through cooling. Health impacts from such emissions would mainly depend on the quality of the utilized water. For any such application, using water that has been purified to maintain its toxic constituents below applicable drinking water standards would prevent the health impacts of concern. Staff typically finds the risk from conventional cooling towers to be at less than significant levels. If reclaimed water from Southeast Water Treatment Plant were to be utilized for this project, tertiary treatment would be required to maintain these pollutants

at the desired levels. Using an effective drift eliminating system would minimize the potentially impacted area. An efficiency of 0.0005% is presently achievable for such systems. Staff considers such hybrid cooling-related water use as incapable of adding significantly to the 0.658 in a million cancer risk calculated for Unit 7 as currently proposed with once-through cooling.

### **Conclusion for Public Health**

Since the proposed once-through cooling system is a closed system that does not expose plant workers or area residents to any constituents of the utilized Bay water, its continued use in the proposed Unit 7 would not introduce any cooling-related health risk to the project area. The use of dry cooling would also prevent exposure to these water constituents, thereby avoiding a significant health risk from facility cooling. The use of hybrid cooling could theoretically introduce a cooling-related risk to the area. However, the requirements for water purification would be adequate to reduce any such health risks to less than significant levels. Compliance with staff's recommended mitigation measures would be adequate to reduce all construction-related air toxics emissions to less than significant levels. Staff concludes from these findings that the dry and hybrid cooling alternatives could each be built and operated in ways that would pose a less than significant public health risk.

## **4.9 SOCIOECONOMIC RESOURCES**

### **Introduction**

Construction of a new power plant could have either adverse or beneficial socioeconomic impacts because the new facility would change the needs for water, land, or public services, require a large temporary construction force, and generate revenues to public agencies. Dry or hybrid cooling alternatives, having potential impacts on noise, land use, and visual conditions, could have impacts on public finance or surrounding neighborhoods that are different from the proposed use of once-through cooling.

### **Socioeconomic Impacts of Dry Cooling**

Dry cooling would not have significant impacts on employment or housing demand, and thus not on schools either. As with other cooling technologies, direct fiscal impacts to San Francisco should be positive because of higher property taxes generated by the new plant. Potential unmitigated visual impacts, resulting from the presence or operation of large dry cooling equipment on the Potrero site, could generate greater community concern about land use compatibility than once-through cooling. This impact of dry cooling could have adverse neighborhood consequences compared to once-through cooling, which could potentially affect the sense of neighborhood and property values. This would be true for both dry cooling alternatives. Potentially significant noise impacts can be reduced with revised fan configurations, but the visual impacts of the air-cooled condensers are considered to be significant and unmitigable for both dry cooling sites (see **Noise** and **Visual Resources** analysis in this study). These impacts also raise environmental justice concerns in the community.

## **Socioeconomic Impacts of Hybrid Cooling**

Hybrid cooling would not have significant impacts on employment or housing demand, and thus not on schools either. As with other cooling technologies, direct fiscal impacts to San Francisco should be positive because of higher property taxes generated by the new plant. Community impacts of hybrid cooling would be similar to those of once-through cooling, and should not be significant from a socioeconomic perspective.

Construction of a pipeline connection to the San Francisco Southeast Water Treatment Center (for the cooling water supply for the hybrid cooling facility) would require construction impacts on city streets. Through coordination with other agencies and public information as proposed in Condition of Certification **SOCIO-3** (but extended to cover the longer disruption of public right-of-way), the construction impacts on city streets could be reduced to less than significant levels. Payment to the City and County of San Francisco for treated water would provide slightly greater fiscal benefits than once-through cooling.

## **Conclusion for Socioeconomics**

Significant neighborhood impacts could be generated if visual or land use impacts of dry cooling cannot be mitigated on the Potrero site. As described in the **Visual Resources** section, the size of proposed structures for the dry cooling alternative would alter community perception and compatibility compared to the once-through cooling alternative. With the exception of these impacts, the socioeconomic impacts are not considered to be substantial or significant for any of the cooling technologies analyzed. The employment and fiscal benefits to the community would remain positive.

## **4.10 TRAFFIC AND TRANSPORTATION**

### **Introduction**

The development of a dry cooling system for the Potrero Unit 7 would increase truck traffic for the delivery of structural steel and other materials and supplies. This would be offset by the reduction of truck deliveries of materials and supplies for the construction of the once-through cooling system including the circulating water intake and discharge structures.

The truck traffic associated with the construction of either a dry or hybrid cooling system would be for the delivery of material, equipment, and supplies that would occur over a six to eight week period. This traffic would result in an increase of two to four truck deliveries per day.

The peak workforce is not expected to increase if the Applicant chooses to opt for dry or hybrid cooling.

### **Traffic and Transportation Impacts of Dry Cooling**

The truck traffic associated with the construction activities for dry cooling should not result in a significant impact on traffic as long as the Applicant follows the mitigation measures and Conditions of Certification set forth in the **Traffic and Transportation** section of the FSA.



## **Traffic and Transportation Impacts of Hybrid Cooling**

The hybrid cooling system would require installation of water pipelines within city streets. Construction impacts on traffic and the truck traffic associated with the hybrid cooling towers should not result in a significant impact on traffic as long as the Applicant follows the mitigation measures and Conditions of Certification set forth in the **Traffic and Transportation** section of the FSA.

### **Conclusion**

The type of cooling system used for Potrero Unit 7 will not have a significant impact on traffic.

## **4.11 VISUAL RESOURCES**

### **Introduction**

This section presents a visual analysis of the various cooling options compared to a baseline established by the existing Potrero Power Plant (Units 3 through 6). Implementation of any of the cooling alternatives would also include the removal of the existing Station A complex with its prominent, geometric block form.

The primary issue of concern with respect to visual resources is the introduction of additional visible structures and plumes into the power plant and waterfront landscape. Specifically, with the dry cooling option, the air-cooled condenser (ACC) would be visible as a large, elevated, geometric structure that could appear quite massive from foreground viewing distances depending on viewing location. The hybrid cooling tower (plume abated design) would be a narrower and lower though longer structure. Its lower height would reduce its potential visibility. In either case, the cooling structures would exhibit an industrial visual character similar to that of other existing and proposed structures at the site.

The following assessment of visual impacts is based on an analysis conducted from nine representative key observation points (KOPs) (see **Visual Resources** section of the FSA).

### **Visual Resources Impacts and Mitigation of Dry Cooling**

#### **Dry Cooling Alternative One**

Under Dry Cooling Alternative One, the proposed power plant facilities including the ACC would be located immediately west of the Unit 3 power building and stack. The ACC would appear as a large elevated box-like structure (269 feet long x 192 feet wide x 108 feet high). Table 8 summarizes Dry Cooling Alternative One's visual impacts by Key Observation Point (KOP). As shown in the table, compared to existing views, an increase in view blockage caused by project structures would be experienced at three of the nine representative viewing areas (KOP 1 – Potrero Hill/Watchman Way, KOP 2 – Potrero Hill/20<sup>th</sup> and Mississippi, and KOP 3 – I-280/Third Street). The resulting visual impact on these three viewing locations would be significant and unmitigable. From KOPs 4 through 9, the resulting visual impacts would be adverse but not significant.

given the relatively small degree of visual contrast and view blockage that would be caused and their limited noticeability from these viewing locations.

Even though Dry Cooling Alternative One would eliminate the visual impact associated with the cooling water intake structure, the proposed project is preferred over Dry Cooling Alternative One because the proposed project would result in less view blockage of higher quality landscape features (Bay waters, East Bay Hills, and sky) when viewed from foreground residential areas and would not cause significant, unmitigable visual impacts. Potential mitigation for visual impacts includes landscaping; surface treatment of structures (color, texture, and design) to minimize visual intrusion, and contrast, and limitations on lighting. However, in the case of Dry Cooling Alternative One, mitigation would not reduce impacts to less than significant levels at several viewpoints, as described in **POTRERO UNIT 7 COOLING OPTIONS Table 8**.

**POTRERO UNIT 7 COOLING OPTIONS Table 8**  
**Summary of Visual Impacts: Dry Cooling Alternative One**  
 (Not Including Vapor Plume Analysis)

KOP	Location	Description of Impact Before Mitigation
KOP 1	Potrero Hill: Watchman Way Neighborhood	<b>Adverse and Significant.</b> The proposed power plant and air-cooled condenser (ACC) would appear co-dominant with the existing structures on and adjacent to the site and would exhibit an industrial character similar to Unit 3. The proposed structures would also block a noticeable portion of Bay waters and East Bay Hills that would otherwise be visible north of the Unit 3 stack and power building. While a portion of this view is presently blocked by the existing Station A building (to be removed as part of the project), there would be a net increase in view blockage of the higher quality landscape features over that presently caused by the existing Station A building and Unit 3 Power Plant.
KOP 2	Potrero Hill: 20 <sup>th</sup> and Mississippi Neighborhood	<b>Adverse and Significant.</b> The proposed power plant and ACC would appear co-dominant with the existing structures on and adjacent to the site and would exhibit an industrial character similar to Unit 3. The proposed structures would also block a noticeable portion of Bay waters and East Bay Hills that would otherwise be visible north and south of the Unit 3 stack. While a portion of this view is presently blocked by the existing Station A building (to be removed as part of the project), there would be a net increase in view blockage of the higher quality landscape features over that presently caused by the existing Station A building and Unit 3 Power Plant.
KOP 3	I-280 / Third Street Neighborhood	<b>Adverse and Significant.</b> The proposed power plant and ACC would appear co-dominant with the existing structures on and adjacent to the site and would block a noticeable portion of the East Bay hills between the Unit 3 stack and the Unit 3 power building and north of the Unit 3 power building. Although the ACC would screen from view a portion of the existing Unit 3 power building, this screening of features with similar visual quality would not compensate for the blockage of higher quality landscape features (Bay and East Bay Hills) by the proposed HRSG facilities and ACC.
KOP 4	Hunters Point Neighborhood	<b>Adverse but Not Significant.</b> The proposed power plant and ACC would block from view a very small portion of visible Bay waters. However, at this middleground viewing distance, the proposed structures and view blockage would be minimally noticeable within the complex waterfront industrial landscape. The resulting visual impacts, though not significant, would be further reduced by implementing recommended mitigation measures and conditions of certification.
KOP 5	Bernal Heights Neighborhood	<b>Adverse but Not Significant.</b> The proposed power plant and ACC would appear co-dominant with the existing structures on and adjacent to the site and would block a small portion of Bay waters and East Bay Hills between the Unit 3 stack and the Unit 3 power building and north of the Unit 3 power building. However, the ACC would screen from view a portion of the existing Unit 3 power building. Also, much of the Bay view that would be blocked by the new facilities is presently blocked from view by the Station A complex. At this middleground viewing distance, the visibility of the proposed project structures and slight increase in view blockage would not substantially detract from the quality of the panoramic landscape. The resulting visual impacts, though not significant, would be further reduced by implementing recommended mitigation measures and conditions of certification.

KOP	Location	Description of Impact Before Mitigation
KOP 6	Bayview Neighborhood	<b>Adverse but Not Significant.</b> The proposed power plant and ACC would appear co-dominant with the existing structures on and adjacent to the site and would block a small portion of Bay waters and East Bay Hills between the Unit 3 stack and the Unit 3 power building and north of the Unit 3 power building. However, the ACC would screen from view a portion of the existing Unit 3 power building, and much of the Bay view that would be blocked by the new facilities is presently blocked from view by the Station A complex. Also, at this middleground viewing distance, the visibility of the proposed project structures and slight increase in view blockage would not substantially detract from the quality of the panoramic landscape. The resulting visual impacts, though not significant, would be further reduced by implementing recommended mitigation measures and conditions of certification.
KOP 7	Pacific Bell Park	<b>Adverse but Not Significant.</b> The proposed power plant and ACC would block from view a very small portion of Hunters Point visible to the south of the project site. However, at this middleground viewing distance, the proposed structures and the view blockage would be minimally noticeable within the complex waterfront industrial landscape. The resulting visual impacts, though not significant, would be further reduced by implementing recommended mitigation measures and conditions of certification.
KOP 8	Agua Vista Park	<b>Adverse but Not Significant.</b> The proposed power plant and ACC would appear co-dominant with the existing structures on and adjacent to the site and would block a small portion of sky above the roof-top horizon line west (to the right) of the existing Unit 3 stack. While maintaining maximum views of sky, Bay waters, and hills is important, from the KOP 8 vantagepoint, the slight increase in view blockage would not be particularly noticeable in the waterfront industrial landscape and would not substantially detract from the quality of the existing view. The resulting visual impacts, though not significant, would be further reduced by implementing recommended mitigation measures and conditions of certification.
KOP 9	San Francisco Bay	<b>Adverse but Not Significant.</b> The proposed power plant and ACC would appear co-dominant with the existing structures on and adjacent to the site, with the ACC being partially screened by the Unit 3 power building. Although a portion of Potrero Hill would be blocked from view, this sightline is already partially blocked by the existing Station A complex. Also, the proposed HRSG structures would block a small portion of sky above Potrero Hill. However, in the viewing context of the existing shoreline industrial landscape, the resulting impact would not detract from the quality of the existing views. Also, implementation of this cooling option would eliminate the need for the prominent and highly visible cooling water intake structure that would be constructed as part of the proposed project. The resulting visual impacts, though not significant, would be further reduced by implementing recommended mitigation measures and conditions of certification.

### Dry Cooling Alternative Two

Under Dry Cooling Alternative Two, the proposed power plant facilities including the ACC would be located immediately west of the Unit 3 power building and stack. The ACC would be located immediately west of Fuel Oil Storage Tank #4 (to the north of the proposed HRSG structures). The ACC would appear as a large elevated box-like structure, approximately 269 feet long x 192 feet wide x 108 feet high. **POTRERO UNIT 7 COOLING OPTIONS Table 9** summarizes Alternative Two's visual impacts by Key Observation Point (KOP). As shown in the table, compared to existing views, an increase in view blockage caused by project structures would be experienced at three of the nine representative viewing areas (KOP 1 – Potrero Hill/Watchman Way, KOP 2 –

Potrero Hill/20<sup>th</sup> and Mississippi, and KOP 3 – I-280/Third Street). The resulting visual impact on these three viewing locations would be significant and unmitigable (available mitigation, described above, would not reduce impacts to less than significant levels). From KOPs 4 through 9, the resulting visual impacts would be adverse but not significant given the relatively small degree of visual contrast and view blockage that would be caused and their limited noticeability from these viewing locations.

Even though Dry Cooling Alternative Two would eliminate the visual impact associated with the cooling water intake structure, the proposed project is preferred over Dry Cooling Alternative Two because the proposed project would result in less view blockage of higher quality landscape features (Bay waters, East Bay Hills, and sky) when viewed from foreground residential areas and would not cause significant, unmitigable visual impacts.

**POTRERO UNIT 7 COOLING OPTIONS Table 9**  
**Summary of Visual Impacts: Dry Cooling Alternative Two**  
 (Not Including Vapor Plume Analysis)

KOP	Location	Description of Impact Before Mitigation
KOP 1	Potrero Hill: Watchman Way Neighborhood	<b>Adverse and Significant.</b> The proposed power plant and ACC would appear co-dominant with the existing structures on and adjacent to the site. While the ACC would screen a portion of Fuel Oil Storage Tank #4, the proposed structures would also block a portion of Bay waters and East Bay Hills visible to the north of the Unit 3 stack and above and to the north of Tank #4. While a portion of this view is presently blocked by the existing Station A building (to be removed as part of the project), there would be a net increase in view blockage of higher quality landscape features over that presently caused by the existing Station A building and Unit 3 power plant.
KOP 2	Potrero Hill: 20 <sup>th</sup> and Mississippi Neighborhood	<b>Adverse and Significant.</b> The proposed power plant and ACC would appear co-dominant with the existing structures on and adjacent to the site and would exhibit an industrial character similar to Unit 3. The proposed structures would block from view a noticeable portion of Bay waters and East Bay Hills visible to the north and south of the Unit 3 stack. A portion of the Unit 3 power building and stack would also be screened by the ACC, and a portion of the Bay view south of the Unit 3 stack is presently blocked by the existing Station A building (to be removed as part of the project). However, there would be a net increase in view blockage of the higher quality landscape features over that presently caused by the existing Station A building and Unit 3 Power Plant.
KOP 3	I-280 / Third Street Neighborhood	<b>Adverse and Significant.</b> The proposed power plant and ACC would appear co-dominant with existing structures on and adjacent to the site and would block from view a noticeable portion of the East Bay Hills visible to the north of the Unit 3 plant and above and to the north (left) of Fuel Oil Storage Tank #4. A portion of Tank #4 would be screened by the ACC and much of the Bay waters and East Bay Hills that would be blocked from view by Unit 7 are already blocked by the existing Station A (to be removed as part of the project). However, there would be a net increase in view blockage of the higher quality landscape features over that presently caused by the existing Station A building and Unit 3 power plant.
KOP 4	Hunters Point Neighborhood	<b>Adverse but Not Significant.</b> The proposed power plant and ACC would block from view some waterfront industrial structures to the north of the project site (similar quality landscape features). However, in the context of a complex waterfront industrial landscape, the proposed structures and view blockage would be minimally noticeable at this middleground viewing distance. The resulting visual impacts, though not

KOP	Location	Description of Impact Before Mitigation
		significant, would be further reduced by implementing recommended mitigation measures and conditions of certification.
KOP 5	Bernal Heights Neighborhood	<b>Adverse but Not Significant.</b> The proposed power plant would appear co-dominant with the existing structures on and adjacent to the site and similar in industrial character to Unit 3. While the power plant HRSG structures would cause a small additional view blockage of East Bay Hills, the ACC would be screened from view by intervening landforms. However, removal of the existing Station A building would open up additional sight lines to Bay waters. The resulting visual impacts, though not significant, would be further reduced by implementing recommended mitigation measures and conditions of certification.
KOP 6	Bayview Neighborhood	<b>Adverse but Not Significant.</b> The proposed power plant and ACC would appear co-dominant with existing structures on and adjacent to the site and would block from view a small portion of Bay waters visible to the north (left) of Unit 3 and above and to the north (left) of Fuel Oil Storage Tank #4. However, a portion of Tank #4 would be screened by the ACC and a portion of the Bay waters that would be blocked from view by the Unit 7 facilities is already blocked by the existing Station A (which would be removed as part of the project). At this middleground viewing distance, and within the context of the waterfront industrial setting, the view blockage resulting from the proposed project would not substantially detract from the quality of the panoramic landscape. The resulting visual impacts, though not significant, would be further reduced by implementing recommended mitigation measures and conditions of certification.
KOP 7	Pacific Bell Park	<b>Adverse but Not Significant.</b> The proposed power plant and ACC would block from view a very small portion of Hunters Point visible to the south of the project site. However, at this middleground viewing distance, the proposed structures and the view blockage would be minimally noticeable within the complex waterfront industrial landscape. The resulting visual impacts, though not significant, would be further reduced by implementing recommended mitigation measures and conditions of certification.
KOP 8	Agua Vista Park	<b>Adverse but Not Significant.</b> The proposed power plant HRSG stacks would be partially visible above the warehouses located along the south side of central basin. The ACC would be screened from view by intervening structures. The slight degree of visual contrast and additional view blockage of sky that would be caused by the upper portions of the HRSG stacks would not be substantially noticeable from this viewing location. The resulting visual impacts, though not significant, would be further reduced by implementing recommended mitigation measures and conditions of certification.
KOP 9	San Francisco Bay	<b>Adverse but Not Significant.</b> The proposed power plant and ACC would appear co-dominant with the existing structures on and adjacent to the site. The ACC would be partially screened by the existing fuel storage tanks. The industrial character of the proposed facilities would appear similar to the existing Unit 3 facilities and would result in a low degree of visual contrast. The proposed structures would also cause a partial blockage of the view to Potrero Hill. However, in the viewing context of the existing shoreline industrial landscape, the resulting impact would not substantially detract from the existing visual quality. Also, implementation of this cooling option would eliminate the need for the prominent and highly visible cooling water intake structure that would be constructed as part of the proposed project. The resulting visual impacts, though not significant, would be further reduced by implementing recommended mitigation measures and conditions of certification.

## Visual Resources Impacts and Mitigation of Hybrid Cooling

Under the Hybrid Cooling Alternative, the proposed power plant facilities including the hybrid cooling tower (HCT) would be located west of the Unit 3 power building and stack. The HCT would be adjacent to 23<sup>rd</sup> Street. The HCT would appear as a linear, rectangular-shape structure (491 feet long x 50 feet wide x 70 feet high). **POTRERO UNIT 7 COOLING OPTIONS Table 10** summarizes the visual impacts of the Hybrid Cooling Alternative by Key Observation Point (KOP). As shown in the table, compared to existing views, the proposed project with HCT would cause relatively small degrees of visual contrast and view blockage, which would have limited noticeability from the nine viewing locations. The resulting visual impacts would be adverse but not significant and would be further reduced with effective implementation of the mitigation measures and conditions of certification recommended in the **Visual Resources FSA** Section.

This alternative would utilize reclaimed water from the Southeast Water Pollution Control Center (SWPCP), located approximately one mile southwest of the power plant site. Although additional construction impacts would result from the construction of a pipeline to transport the water to the site, these impacts would be temporary and there would be no lasting visual evidence of the pipeline's presence.

The hybrid cooling alternative is preferred over the proposed project because it would eliminate visual impacts associated with the Unit 7 cooling water intake structure, without causing significant view blockage of higher quality landscape features.

**POTRERO UNIT 7 COOLING OPTIONS Table 10**  
**Summary of Visual Impacts: Hybrid Cooling**  
(Not Including Vapor Plume Analysis)

<b>KOP</b>	<b>Location</b>	<b>Description of Impact Before Mitigation</b>
KOP 1	Potrero Hill: Watchman Way Neighborhood	<b>Adverse but Not Significant.</b> The proposed power plant with hybrid cooling tower (HCT) would appear co-dominant with the existing structures on and adjacent to the site and would exhibit an industrial character similar to Unit 3. The proposed power plant would block a portion of Bay waters and East Bay Hills that would otherwise be visible north (to the left) of the Unit 3 power building and stack. However, a portion of this view is presently blocked by the existing Station A building (to be removed as part of the project). The small portion of Bay waters that would be blocked from view by the HCT is presently blocked from view by the Station A building. Also, with removal of Station A, additional sight lines would be opened up through the site to Bay waters that are presently not visible. The resulting visual impacts, though not significant, would be further reduced by implementing recommended mitigation measures and conditions of certification.
KOP 2	Potrero Hill: 20 <sup>th</sup> and Mississippi Neighborhood	<b>Adverse but Not Significant.</b> The proposed power plant with HCT would appear co-dominant with the existing structures on and adjacent to the site and would exhibit an industrial character similar to Unit 3. The proposed power plant would block a portion of Bay waters and East Bay Hills that would otherwise be visible south (to the right) of the Unit 3 stack. However, much of this view is presently blocked by the existing Station A building (to be

KOP	Location	Description of Impact Before Mitigation
		removed as part of the project). The small portion of Bay waters that would be blocked from view by the HCT is presently blocked from view by the Station A building. Also, with removal of Station A, additional sight lines would be opened up through the site to Bay waters that are presently not visible. The resulting visual impacts, though not significant, would be further reduced by implementing recommended mitigation measures and conditions of certification.
KOP 3	I-280 / Third Street Neighborhood	<b>Adverse but Not Significant.</b> The proposed power plant with HCT would appear co-dominant with the existing structures on and adjacent to the site and would exhibit an industrial character similar to Unit 3. The proposed power plant would block a portion of Bay waters and East Bay Hills that would otherwise be visible north (to the left) of the Unit 3 power plant and stack. However, much of this view is presently blocked by the existing Station A building (to be removed as part of the project). The HCT would be effectively screened from view by the warehouse located to the south of the site. Also, with removal of Station A, additional sight lines would be opened up through the site to Bay waters and the East Bay Hills that are presently not visible. The resulting visual impacts, though not significant, would be further reduced by implementing recommended mitigation measures and conditions of certification.
KOP 4	Hunters Point Neighborhood	<b>Adverse but Not Significant.</b> The proposed power plant and HCT would block from view a very small portion of visible industrial development north of site. However, the HCT would be minimally visible because of the screening provided by the warehouse located to the south of the site. At this middleground viewing distance, the proposed structures and view blockage would be minimally noticeable within the complex waterfront industrial landscape. The resulting visual impacts, though not significant, would be further reduced by implementing recommended mitigation measures and conditions of certification.
KOP 5	Bernal Heights Neighborhood	<b>Adverse but Not Significant.</b> The proposed power plant with HCT would appear co-dominant with the existing structures on and adjacent to the site and would block a small portion of Bay waters and East Bay Hills north of the Unit 3 power building. However, the HCT would be substantially screened by the structures immediately south of the project site. Much of the Bay view that would be blocked by the new facilities is presently blocked from view by the Station A complex. Also, at this middleground viewing distance, the proposed project structures and slight increase in view blockage would not substantially detract from the quality of the panoramic landscape. The resulting visual impacts, though not significant, would be further reduced by implementing recommended mitigation measures and conditions of certification.
KOP 6	Bayview Neighborhood	<b>Adverse but Not Significant.</b> The proposed power plant with HCT would appear co-dominant with the existing structures on and adjacent to the site and would block a portion of Bay waters and East Bay Hills visible to the left of the Unit 3 power building and stack. However, the HCT would be substantially screened by the structures immediately south of the project site. Also, much of the Bay view that would be blocked by the new facilities is presently blocked from view by the Station A complex. At this middleground viewing distance, the proposed project structures and slight increase in view blockage would not substantially detract from the quality of the panoramic landscape. The resulting visual impacts, though not significant, would be



KOP	Location	Description of Impact Before Mitigation
		further reduced by implementing recommended mitigation measures and conditions of certification.
KOP 7	Pacific Bell Park	<b>Adverse but Not Significant.</b> The proposed power plant with HCT would block a very small portion of Hunters Point visible to the south of the project site. However, the HCT would be minimally visible on the site because of its relatively low height and the screening provided by intervening structures and buildings north of the site. At this middleground viewing distance, the proposed structures and resulting view blockage would be minimally noticeable within the complex waterfront industrial landscape. Also, the resulting visual impacts, though not significant, would be further reduced by implementing recommended mitigation measures and conditions of certification.
KOP 8	Agua Vista Park	<b>Adverse but Not Significant.</b> The proposed power plant with HCT would appear co-dominant with the existing structures on and adjacent to the site and would block a small portion of sky above the roof-top horizon line west (to the right) of the existing Unit 3 stack. However, the HCT would be completely screened from view by the intervening buildings immediately north of the project site. While maintaining maximum views of sky, Bay waters, and hills is important, from the KOP 8 vantagepoint, the slight increase in view blockage would not be particularly noticeable in the waterfront industrial landscape nor would it substantially detract from the quality of the existing view. Also, the resulting visual impacts, though not significant, would be further reduced by implementing recommended mitigation measures and conditions of certification.
KOP 9	San Francisco Bay	<b>Adverse but Not Significant.</b> The proposed power plant with HCT would appear co-dominant with the existing structures on and adjacent to the site. However, the HCT would be minimally visible because of its relatively low height and the screening provided by the intervening Unit 3 structures. Although a portion of Potrero Hill would be blocked from view, this sightline is already partially blocked by the existing Station A complex. Also, the proposed HRSG structures would block a small portion of sky above Potrero Hill. However, in the viewing context of the existing shoreline industrial landscape, the resulting impact would not detract from the quality of the existing views. Also, implementation of this cooling option would eliminate the need for the prominent and highly visible cooling water intake structure that would be constructed as part of the proposed project. Furthermore, the resulting visual impacts, though not significant, would be further reduced by implementing recommended mitigation measures and conditions of certification.

### Conclusion for Visual Resources

The hybrid cooling alternative is preferred over the proposed project and both of the dry cooling alternatives because it would eliminate the visual impacts of the cooling water intake structure associated with the proposed project, without causing the significant view blockage of Bay waters, East Bay hills, or sky as would be the case with the dry cooling alternatives. The proposed project would be preferred over the two dry cooling alternatives because the proposed project would result in less view blockage of higher quality landscape features (Bay waters, East Bay hills, and sky) when viewed from foreground residential areas. The two dry cooling alternatives are least preferred because the visual benefit of eliminating the Unit 7 water intake structure would not

sufficiently offset the permanent view blockage of higher quality landscape features caused by the elevated dry cooling structure. Significant visual impacts would result from installation of either dry cooling alternative, but not from hybrid cooling.

## **4.12 WASTE MANAGEMENT**

### **Introduction**

This section evaluates the waste management impacts of dry cooling and hybrid cooling technologies for the Potrero Unit 7 project. The technical area of waste management encompasses both hazardous and non-hazardous wastes that are generated during facility construction and operation. Construction wastes include those associated with site preparation, such as contaminated soil from excavating activities, in addition to those generated during actual facility construction. Once-through cooling does not generate any wastes during operation.

### **Waste Management Impacts of Dry Cooling**

Wastes generated during construction of the air-cooled condenser (ACC) at either location (Dry Cooling Alternatives One or Two) would consist of relatively minor amounts of hazardous and non-hazardous wastes such as: excess paint, packing materials, concrete, lumber, spent solvent, and clean-up materials. The amount of soil that would need to be excavated would depend on the final design chosen, but may not be significant if the ACC were built on pilings. Classification of the excavated material would take place after it is stockpiled. It would then be sampled and analyzed to determine on-site reuse or off-site disposal options in accordance with the final Site Mitigation and Implementation Plan. The potential location for Dry Cooling Alternative Two (on land owned by PG&E) was not part of the Environmental Site Assessment, so no conclusions can be drawn regarding the potential for contaminated soil to be present at that site. Operation of either dry cooling location would not generate any wastes during operation. Installation of the dry cooling system would eliminate the dredging of 4,050 cubic yards of sediment that would be associated with the new water intake structures.

### **Waste Management Impacts of Hybrid Cooling**

Construction of a hybrid cooling system would generate wastes similar to those from the other cooling technologies. The amount of soil from excavation activities could be larger, since pilings would not likely be used. Instead, a basin would be constructed that would be placed on the ground, with some excavation required. There could be minor amounts of additional waste generated from construction of a pipeline used to bring cooling water to the Potrero site from the San Francisco Southeast Water Treatment Plant, located about one mile to the south.

During operation of the hybrid cooling system, relatively minor amounts of sludge collect in the basin of the cooling tower and would require removal every few years. The sludge would require testing to determine its classification as hazardous or non-hazardous.

## **Conclusion for Waste Management**

Staff does not consider the waste management impacts from the dry or hybrid cooling technologies to be significantly different from those of once-through cooling, since rather minor amounts of wastes would be generated from any of the technologies. Once-through and dry cooling do not generate any operational wastes, and hybrid cooling generates only a small amount from operation. The types of construction wastes generated would be similar for all three cooling options, with perhaps the least amount of excavation required for dry cooling, because it would be placed on pilings.

## **4.13 SOIL AND WATER RESOURCES**

### **Introduction**

This section analyzes potential impacts on soil and water resources from the construction and operation of dry and hybrid cooling. The analysis focuses on the potential for induced erosion and sedimentation and any adverse impacts to water quality and quantity stemming from the cooling options.

### **Soil and Water Resources Impacts of Dry Cooling**

Earthmoving activities associated with dry cooling would primarily be limited to the construction of the structure. Accelerated wind- and water-induced erosion may result from such earthmoving activities, possibly resulting in increased sediment load within the San Francisco Bay. The dry cooling earthmoving activity would be included as part of the Unit 7 National Pollutant Discharge Elimination System (NPDES) permit for stormwater discharge from construction activities. As required within the permit, the Applicant must develop a Stormwater Pollution Prevention Plan (SWPPP) that identifies Best Management Practices (BMPs) used to properly manage the quantity and quality of stormwater with regard to erosion and sedimentation. Examples of BMPs are the use of sediment barriers, limiting the amount of exposed areas, and construction of conveyance channels, sediment traps, and stormwater control devices. The BMPs would serve as mitigation by minimizing erosion and sedimentation; therefore, impacts related to erosion and sedimentation would be less than significant.

Project excavation may encounter potentially contaminated soils and/or groundwater. The Applicant prepared a Site Mitigation and Implementation Plan (SECAL 2000a, Appendix D) that discusses options as to the handling of the contaminated soils. Refer to the **Soil and Water Resources** and **Waste Management** sections of the FSA for discussions on contaminated soils and groundwater that specify appropriate mitigation measures and Conditions of Certification to ensure less than significant impacts.

Construction and operation of the dry cooling system would not require dredging or disturbance of contaminated Bay sediments. Therefore, this technology would comply with the McAteer-Petris Act.

### **Soil and Water Resources Impacts of Hybrid Cooling**

The hybrid cooling system would require construction of a 10-celled cooling tower and pair of water pipelines. The cooling tower, which would encompass approximately 0.5 acre, would be constructed along the southern portion of the site, between the Unit 3

and Unit 7 power blocks. The source of cooling water for the Unit 7 project would be from the Southeast Water Pollution Control Plant (WPCP), requiring installation of 16-inch and 8-inch water pipelines. The water pipelines, which would extend approximately one mile, would be installed within San Francisco street corridors and under Islais Creek.

Earthmoving for the cooling towers and pipelines would impact approximately 2 acres. Because a SWPPP would be developed, impacts related to erosion and sediment control and stormwater runoff would be reduced to less than significant levels through implementation of BMPs (refer to the dry cooling impact analysis above for a general discussion of BMPs). Boring under Islais Creek could cause drilling fluids to be released in the creek, and potentially deposit contaminated sediments on the channel bottom. However, impacts would be reduced to less than significant levels with implementation of a Frac-Out Contingency Plan.

Excavation activities could disturb potentially contaminated soils and/or groundwater; therefore, proper handling and disposal procedures may be necessary. Refer to the **Soil and Water Resources** and **Waste Management** sections of the FSA for discussions on contaminated soils and groundwater, and appropriate mitigation measures and Conditions of Certification to ensure less than significant impacts.

Because the hybrid cooling alternative would not necessitate dredging and filling operations in the Bay, this technology would be in compliance with the McAtter-Petris Act.

### **Conclusion for Soil and Water Resources**

The proposed once-through cooling system would require dredging and filling within the Bay in order to install an intake structure and two outfall structures. The dry and hybrid cooling technologies eliminate the need for intake/outfall structures and are limited to upland locations.

The dry cooling alternatives would be limited to on-site earthmoving activities and the structure would encompass approximately 1.5 acres. The hybrid cooling alternative would require both on-site and off-site earthmoving activities, as well as boring under Islais Creek, resulting in earthmoving disturbance on approximately 3 acres. Because earthmoving activities related to either dry cooling site would be limited to the Unit 7 area, dry cooling would have fewer impacts than the hybrid cooling option, which requires construction of an off-site pipeline. Thus, the dry cooling option would be the preferred alternative from an erosion and sedimentation perspective related to soil and water resources.

Both the dry cooling and once-through cooling options would have less than significant impacts related to erosion and sedimentation via the aforementioned supporting mitigation measures. However, as described in the **Soil and Water Resources** section of the FSA, the once-through cooling process would not be in compliance with the McAtter-Petris Act. In contrast, the dry cooling option is not subject to the McAtter-Petris Act because construction and operation would be restricted to an upland location.

From a Soil and Water LORS standpoint, the dry cooling option would be preferred. There is little difference between the dry cooling alternative locations.

## 5 ENGINEERING ANALYSIS OF COOLING OPTIONS

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This Chapter presents analysis of cooling options in three engineering areas: Facility Design, Power Plant Reliability and Efficiency, and Geology and Paleontology.

### 5.1 FACILITY DESIGN

Facility Design encompasses the civil, structural, mechanical, and electrical engineering design of the project. The purpose of the Facility Design analysis is to, among other things, provide reasonable assurance that the project can be designed and constructed in accordance with all applicable LORS and in a manner that assures public health and safety. Conditions of Certification have been established that will ensure that the proposed power plant is designed and constructed in compliance with applicable LORS.

#### Introduction

Three alternative cooling options (conceptual design level of detail) have been identified for the Unit 7 power plant: two dry cooling system alternatives, and one hybrid (wet/dry) cooling system alternatives. Each of the cooling system alternatives would require the construction of some fixed facilities (e.g., foundations, structures, mechanical systems, electrical systems, control systems, etc.). The proposed Conditions of Certification for this project cover the design and construction of these types of fixed facilities.

#### Facility Design Impacts of Dry Cooling

The dry cooling system alternatives would require the construction of some fixed facilities (e.g., foundations, structures, mechanical systems, electrical systems, control systems, etc.). The proposed Conditions of Certification cover the design and construction of these types of fixed facilities. If one of the dry cooling system alternatives is selected, Table 1, included in the Facility Design Final Staff Assessment, will need to be revised accordingly.

#### Facility Design Impacts of Hybrid Cooling

The hybrid cooling system alternative would also require the construction of some fixed facilities (e.g., foundations, structures, mechanical systems, electrical systems, control systems, etc.). The proposed Conditions of Certification cover the design and construction of these types of fixed facilities. If the hybrid cooling system alternative is selected, **FACILITY DESIGN Table 1** in the **Facility Design** FSA Section will need to be revised accordingly.

#### Conclusion for Facility Design

The proposed Conditions of Certification adequately address the engineering concerns associated with all identified cooling system options. If an alternative cooling system is selected, Table 1 in the **Facility Design** FSA Section will need to be revised. This table lists the major structures and equipment associated with the facility. The proposed Conditions of Certification require the Applicant to submit pertinent design documents for these major structures and equipment to the Chief Building Official (CBO). The CBO

would then verify that the designs and construction are in accordance with applicable LORS.

## **5.2 POWER PLANT RELIABILITY AND EFFICIENCY**

### **Reliability**

In this analysis, the reliability issues of the alternate cooling systems are assessed to determine if they would significantly impact the proposed power plant reliability. As a basis, typical industry norms for reliability of power generation are considered. Using this level of reliability as a benchmark measures the project likelihood of not degrading the overall reliability of the electric system it serves compared to the proposed once-through cooling system.

The scope of this power plant reliability analysis covers:

- Equipment and plant availability; and
- Water availability.

Equipment required for both the dry and the wet/dry cooling alternatives is commonly available within the power generating industry in sizes and configurations similar to the Unit 7 plant (See Sections 2.1 and 2.2 of this Appendix). Plant availability is reduced with the dry cooling system and also, but to a lesser extent with the wet/dry cooling system when compared to the once-through system. This is due to the fact that on high temperature days when the plant output is most likely to be needed to supply peak electrical loads, the plant capabilities are reduced. This is because during these conditions the condenser backpressure will increase causing the steam turbine output to be reduced. The extent of this reduction will vary depending upon specific weather conditions.

Water availability is not an issue for the dry air-cooled condenser cooling system since the turbine exhaust steam is sent directly to the air-cooled condenser and requires no intermediate water for cooling. However, for the wet/dry system water is required for the cooling tower makeup due to losses from evaporation, drift, and blowdown. This water would be provided from the Southeast Water Pollution Control Plant secondary effluent. After treatment to a tertiary level the water would be used as makeup to the wet/dry system. As stated above this, supply is subject to as much as 12 outages per year with durations up to 22 hours in length. To overcome this exposure, storage facilities would be required for 3.5-4 million gallons of treated water.

With proper design considerations, plant reliability would not be impacted to a degree that would make the construction and operation of Unit 7 unacceptable.

### **Efficiency**

The efficiency consideration in this assessment of the alternate cooling systems is reviewed to determine if any additional consumption of energy creates a significant adverse impact. In this analysis staff addresses the issue of inefficient and unnecessary consumption of energy.

The primary points assessed are to:

- Determine whether the facility would likely present any adverse impacts upon energy resources;
- Determine whether these adverse impacts are significant

Both the dry and wet/dry alternative cooling systems would result in the less efficient use of fuel when compared to the proposed once-through cooling system. This is due to the reduced output described in this assessment when using either dry or wet/dry alternatives. Considering the dry air-cooled condenser alternative, the drop in efficiency would be expected to be approximately 2.5% on an annual basis. For the wet/dry alternative this drop would be expected to be approximately 1% on an annual basis.

These drops in efficiencies would not be deemed to be great enough to cause any significant adverse impacts to the availability of fuel, nor would they be considered to be wasteful, inefficient or cause unnecessary fuel or energy consumption.

### **5.3 GEOLOGY AND PALEONTOLOGY**

#### **Introduction**

Two alternative locations have been proposed for the dry cooling structure: Dry Cooling Alternative One is located on the eastern half of the power plant site and overlies tidelands deposits, and Dry Cooling Alternative Two is located in the northwest corner of the site and overlies serpentinite bedrock. The proposed once-through cooling water intake structure would overlie fill and bay mud deposits along the margin of San Francisco Bay.

The Hybrid Cooling Alternative would parallel the cooling water discharge pipeline along the southern margin of the site and span the bedrock that originally formed Potrero Point and the tidelands reclaimed from the bay. The western half of the Hybrid Cooling Alternative would be founded on bedrock, while the eastern half would overlie fill and bay mud deposits.

The serpentinite bedrock varies in depth underneath the existing Potrero Power Plant site from a depth of generally less than five feet below grade in the northwest corner of the site, to up to eighty-five feet below grade immediately adjacent to the bay. The entire site is mantled by artificial fill. Between 5 and 20 feet of fill overlie the bedrock and tidal flat deposits of bay mud and/or alluvium.

#### **Geology and Paleontology Impacts of Dry and Hybrid Cooling**

##### **Geologic Hazards**

**Faulting and Seismicity.** No active or potentially active faults are known to cross the Potrero Power Plant site. Therefore, the potential for fault rupture beneath the footprint of any of the cooling alternatives is considered to be very low.



The ground shaking impacts for the Dry/Wet and Dry Cooling Alternatives are similar to the impacts for the Potrero Power Plant Unit 7 Project. Using the Abrahamson-Silva 1997 attenuation relationship, a moment magnitude 7.9 earthquake on the San Andreas fault would produce an estimated peak bedrock acceleration for the power plant site of 0.65g. Dry Cooling Alternative 2 will be located on bedrock and will be subject to the estimated peak bedrock acceleration. The Hybrid Cooling Alternative and Dry Cooling Alternative 1 would be located over younger bay mud deposits, which may amplify the peak ground accelerations.

The calculated peak ground acceleration is generally consistent with the California Division of Mines and Geology (CDMG) Map Sheet 48, which predicts a peak ground acceleration with a 10% chance of exceedance in 50 years of between 0.5 g and 0.6 g for the project area.

**Liquefaction, Hydrocompaction, and Expansive Soils.** The depth to groundwater at the proposed site generally varies from approximately 2 feet below existing grade to 14.5 feet below existing grade. The combination of saturated soils of varying density and a potential for a moderately high peak horizontal ground acceleration points to a moderate potential for liquefaction at the site. Due to the heterogeneous character of the fill, potentially liquefiable soils are expected to occur as zones or pockets, rather than as horizontally or vertically continuous layers. The potential for liquefaction induced lateral spreading within the fill is considered low because of the low surface gradients at the project site and the heterogeneous nature of the fill. Localized subsidence due to seismically induced densification of loose granular zones of fill is considered the most likely expression of liquefaction at the project site. Both the Dry/Wet Cooling Alternative and Dry Cooling Alternative One are located over potentially liquefiable soils. Dry Cooling Alternative Two is located over bedrock and would not be subject to liquefaction. Liquefaction is to be accounted for during the final design of the project's foundation.

The potential for damage to the project facilities from expansive soils is expected to be low.

**Landslides.** Landsliding potential at the power plant site is considered to be low, since the project is located on a fill pad that has a slope of between 1% and 2%.

### **Geological and Paleontological Resources**

No geological resources have been identified at the power plant location or surrounding area.

The proposed expansion site footprint is highly disturbed and the bay deposits beneath the site are geologically very young. Therefore, excavations, drilling, clearing and brushing operations, and grading of the fill, alluvium, and bay deposits at the power plant site associated with construction of the cooling structure alternatives are considered to present a low potential impact to paleontological resources.

### **Conclusion for Geology and Paleontology**

Staff proposes to ensure compliance with applicable LORS for geological hazards, geological and paleontological resources for the selected cooling alternative with the adoption of the proposed Conditions of Certification in the **Geology and Paleontology** FSA section.

The only significant geologic hazards associated with the cooling alternatives are strong ground shaking and liquefaction potential. Condition of Certification **GEO-2** requires preparation of a Engineering Geology Report that addresses these issues and provides design recommendations to mitigate any potential impacts. The project should have no adverse impact with respect to geological and paleontological resources, if project design and construction complies with Condition of Certification **GEO-2** and the applicable LORS.

In addition, the adoption and implementation of the proposed monitoring program outlined in the Conditions of Certification for paleontology should mitigate any potential impacts to paleontological resources encountered construction of this project.

## 6 CONCLUSION: COMPARISON OF COOLING OPTIONS

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Chapters 4 and 5 of this Appendix describe the potential impacts of dry cooling (in two possible locations) and hybrid cooling facilities to serve the Potrero Unit 7 Project. These cooling facilities would replace the proposed use of once-through cooling, and the existing intake and outfall serving Unit 3 would remain unchanged. This study was undertaken because of potential significant impacts of once-through cooling to aquatic biological resources, and to satisfy the alternatives analysis requirement of the McAteer-Petris Act under which BCDC operates.

The environmental and engineering disciplines can be divided into two groups: those with the potential for significant impacts, and those in which impacts are easily mitigable or less than significant. Disciplines in which impacts would be less than significant for all three types of cooling (some with implementation of standard mitigation or conditions of certification) are the following:

- Cultural resources
- Hazardous materials
- Worker safety
- Public health
- Traffic and transportation
- Water and soil
- Geology and paleontology
- Terrestrial biology
- Waste
- Power plant reliability

The disciplines where potential impacts from dry and hybrid cooling technologies are of most concern are air quality, noise, visual resources, and land use. Plant operators also indicate concerns about power plant efficiency. The conclusions of these analyses are described below.

- **Air Quality:** Emissions for dry and hybrid cooling would be greater than those for once-through cooling, but impacts are found to be less than significant because offsets are required. Particulate emissions would be slightly greater with both dry and hybrid cooling because in dry cooling, fans would re-suspend particulate matter in the area, and hybrid cooling creates minor particulate emissions associated with cooling tower drift. This conclusion in air quality results in a finding that public health impacts of dry and hybrid cooling would also be less than significant.
- **Noise:** Noise from dry and hybrid cooling would create significant impacts if the proposed designs (as defined in Chapter 3) were used. However, design options are presented in which fan configuration is modified and noise levels are reduced to less than significant levels. Additional noise mitigation is described, but not recommended since fan design alone would reduce noise to acceptable levels.

**Visual Resources:** The visual impacts of each cooling option are evaluated from key viewpoints surrounding the Potrero site. Visual impacts of the hybrid cooling tower are found to be less than significant, but the visual impacts of both dry cooling options are found to be significant and unmitigable from several key viewpoints. The finding that dry cooling would have a significant visual impact creates secondary significant impact determinations in both land use (due to lack of compatibility with adjacent land uses) and socioeconomics (due to community perception and compatibility of the site with the neighborhood).

- **Land Use:** The dry cooling alternative (at either site) would create land use incompatibility impacts stemming from significant impacts to visual resources. From a land use perspective, the proposed project and the hybrid cooling alternative are not substantially different from each other.
- **Power Plant Efficiency:** As described in Chapters 2 and 3, dry and hybrid cooling technologies are less efficient than once-through cooling in cooling steam, so power generation is slightly reduced using these technologies. Also, additional electricity is required to operate the cooling fans, so net power generation is reduced for that reason as well. The reductions in efficiency are found to be small (2.5% for dry cooling and 1% for hybrid cooling), and they are determined not to cause significant adverse impacts on the availability of fuel or to cause wasteful or inefficient energy consumption.

## 7 RECOMMENDATION

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Staff identifies hybrid cooling as a feasible upland alternative to once-through cooling that: 1) eliminates all impacts to aquatic biological resources, 2) removes any once-through cooling system-related permitting and review needs, such as the and Endangered Species Act consultation, and 3) avoids significant visual resources impacts posed by the dry cooling alternative. Therefore, staff recommends that the applicant amend its AFC by replacing its once-through cooling proposal with a hybrid power plant cooling system.

Staff acknowledges that the applicant may elect to pursue some other form of upland cooling alternative that may prove to be at least as feasible as a hybrid cooling system. Staff further acknowledges that any amendment to the AFC would require fundamental changes in the project description that, in turn, would require additional time for analysis. Nonetheless, staff believes that such a change would allow for the certification, construction and operation of Potrero Unit 7.

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# TERRESTRIAL BIOLOGICAL RESOURCES

Testimony of Shari Koslowsky and Rick York

## INTRODUCTION

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This section provides the Energy Commission's Final Staff Assessment (FSA) of potential impacts to terrestrial biological resources from the construction and operation of the Potrero Power Plant Unit 7 Project (Unit 7) proposed by Mirant California, LLC (Mirant). This analysis addresses potential impacts to state and federally listed species, species of special concern, and areas of critical biological concern. This analysis also describes the biological resources of the project site and at the locations of ancillary facilities. It also determines the need for mitigation, the adequacy of mitigation proposed by the applicant, and where necessary, specifies additional mitigation measures to reduce identified impacts to less than significant levels. It also determines compliance with applicable laws, ordinances, regulations and standards (LORS), and recommends conditions of certification.

This analysis is based, in part, upon information provided in the Application for Certification (AFC) for the Potrero Power Plant Unit 7 Project (SECAL 2000a, AFC Section 8.2 and Appendix H), Supplemental Information to the AFC (SECAL 2000b), various responses to staff data requests, workshops, site visits and discussions with various agency representatives.

## LAWS, ORDINANCES, REGULATIONS, AND STANDARDS (LORS)

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The applicant will need to abide by the following laws, ordinances, regulations, and standards during project construction and operation.

### FEDERAL

#### **Endangered Species Act of 1973**

Title 16, United States Code, section 1531 *et seq.*, and Title 50, Code of Federal Regulations, part 17.1 *et seq.*, designate and provide for protection of threatened and endangered plant and animal species, and their critical habitat. The administering agency is the USFWS.

#### **Migratory Bird Treaty Act**

Title 16, United States Code, sections 703 through 712, prohibit the take of migratory birds, including nests with viable eggs. The administering agency is the USFWS.

### STATE

#### **California Endangered Species Act of 1984**

Fish and Game Code sections 2050 through 2098 protect California's rare, threatened, and endangered species.



## **California Code of Regulations**

California Code of Regulations Title 14, Division 1, Subdivision 3, Chapter 3, sections 670.2 and 670.5 list plants and animals of California that are designated as rare, threatened or endangered.

## **Fully Protected Species**

Fish and Game Code sections 3511, 4700, 5050, and 5515 prohibit take of animals that are classified as fully protected in California.

## **Nest or Eggs – Take, Possess, or Destroy**

Fish and Game Code section 3503 protects California's birds by making it unlawful to take, possess, or needlessly destroy the nest or eggs of any bird. Section 3503.5 specifically protects California's birds of prey and their eggs by making it unlawful to take, possess, or destroy any birds of prey or to take, possess, or destroy the nest or eggs of any such bird.

## **Migratory Birds – Take or Possession**

Fish and Game Code section 3513 protects California's migratory birds by making it unlawful to take or possess any migratory non-game bird as designated in the Migratory Bird Treaty Act or any part of such migratory non-game bird.

## **Significant Natural Areas**

Fish and Game Code section 1930 *et seq.* designates certain areas such as refuges, natural sloughs, riparian areas and vernal pools as significant wildlife habitat.

## **Native Plant Protection Act of 1977**

Fish and Game Code section 1900 *et seq.* designates state rare, threatened, and endangered plants.

## **LOCAL**

## **City and County of San Francisco General Plan**

This Plan provides general objectives and policies towards preservation and protection of biological resources. There are no activities associated with construction or operation of the Unit 7 that affect sensitive habitats, areas or other terrestrial biology issues addressed in this document. However, the following objective and policies are generally applicable:

### **Objective 8: Ensure the Protection of Plant and Animal Life in the City**

This objective and associated policies emphasize the protection of the scarce plant and wildlife communities in the San Francisco area, remaining undeveloped areas and parks, and rare and endangered species.

## **Sustainability Plan for the City and County of San Francisco**

This advisory document was adopted by the City and County of San Francisco in 1997 and provides goals, objectives and actions for restoring and maintaining biodiversity.

## **San Mateo County General Plan**

The natural resources objectives and policies of this Plan are applicable insofar as offsite emissions may affect adjacent sensitive biological resources in San Bruno State and County Park located in San Mateo County.

### **SETTING**

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#### **REGIONAL**

The proposed project site is located on the western shore of central San Francisco Bay in the City and County of San Francisco, approximately 10 miles north of the San Francisco International Airport. The major project features and actions include:

- demolition of old buildings within the project footprint;
- construction of two gas turbine and one steam generator with transformers and ancillary systems;
- construction of a steam condenser and once through sea water cooling system for Unit 7;
- construction of a new cooling water intake structure to provide condenser cooling water to the new Unit 7 and existing Unit 3 and corresponding discharge system;
- construction of a switchyard for the Potrero Power Plant;
- construction of 230 kV underground transmission cables to the Hunters Point Substation;
- electrical interconnection of the Potrero Power Plant to PG&E's existing Potrero and Hunters Point Substations;
- interconnection of Unit 7 to an existing PG& E natural gas meter and natural gas supply within the Potrero Power Plant; and
- construction of an aqueous ammonia unloading and storage facility.

In addition, the existing Potrero Unit 3 will be retrofitted with Selective Catalytic Reduction (SCR) emission control equipment and low NO<sub>x</sub> burners. Although this is a separate future project that will be undertaken concurrently with the Unit 7 construction, it is relevant to understanding the long term net effects of air emissions from the plant on biological resources.

The site is immediately surrounded on the north, west and south by industrial and commercial land use; however outside this immediate area land use changes to a mixture of residential and commercial. Offsite transmission facilities extend southward through commercial and industrial land use traversing Islais Creek. Within a four mile radius of the plant site Heron's Head Park is located approximately 1.5 miles to the SSE, adjacent to the terminus of the proposed transmission interconnection to the Hunters Point Power Plant; San Bruno Mountain is located approximately 4.5 miles to the SW; and Central San Francisco Bay immediately adjacent to the site. Other small urban parks are located throughout the area.

Historically this region of California that includes the San Francisco Bay area supported several types of vegetation, depending on climate, exposure and topography: salt and brackish marsh, freshwater marsh, grassland, scrub, and chaparral (Sawyer et al. 1995; USGS 2000). As previously noted, land use throughout the region beyond the Potrero site is decidedly urban. Native vegetation outside of protected areas persists only as remnants in undeveloped or abandoned lots. All vegetation and wildlife habitat in the Bay area, regardless of whether it is protected, has been impacted or degraded by various anthropogenic factors associated with urban environments, such as invasion by non-native species, noise, alteration of surface drainage and hydrological conditions, soil and air contamination, and other human disturbances.

### **Heron's Head Park**

Heron's Head Park is a 25-acre peninsula located at the foot of Cargo Way, off of Third Street. The Port of San Francisco created this land, formerly known as Pier 98, in the 1970s by placing fill in the bay with the intention of supporting maritime operations. Although its original purpose was never realized, Heron's Head Park contains approximately eight acres of tidal salt marsh, housing shorebirds and other wildlife and 17 acres of upland habitat. It is one of only a few wetlands located in an industrialized area in the region. (Bubtana 1999)

### **San Bruno Mountains**

San Bruno Mountains is a 3,600-acre wildlife refuge in a sea of urbanization. At the summit, San Bruno Mountain rises 1,314 feet above sea level with a main ridge extending 4 miles long. It is surrounded on all sides by cities: Daly City, Colma, South San Francisco, and Brisbane. It is home to three rare (two endangered and one threatened) species of butterflies, and 10 species of rare plants. Conflicting interests for urbanization and habitat conservation were documented in 1983 with adoption of the San Bruno Mountain Area Habitat Conservation Plan that was one of the first plans developed under the Endangered Species Act that allowed "incidental take" of endangered species on private property. The HCP designates 11% (368) acres of the Mountain for planned development; 81% (2,752 acres) for conserved habitat; and 8% (260 acres) subject to further analysis.

The factors contributing to the Mountain's high biological diversity are its variable topography and microclimates. The main ridge separates the steeper and dryer southeast slopes from the more gradual and wetter northwest facing slopes. The southeast side is dominated by native and introduced grassland vegetation, while the northwest side is comprised of mostly coastal scrub, and riparian scrub/woodland plant communities. In addition, soils include small patches of serpentine soils. These soils provide harsh conditions for plant growth including low fertility essential to plant growth, and naturally high concentrations of heavy metals that are toxic to most plant life. Despite these conditions, serpentine and other poorly developed soils like those that exist on San Bruno Mountain, support high numbers of rare and/or endemic plant species adapted to tolerate these environments and have been able to persist due to the lack of competition from non-native species that are intolerant to these difficult growing conditions (SFSU, 2001).

## **Special Status Species**

Biological Resources Table 1 lists the sensitive species identified by the California Department of Fish and Game's California Natural Diversity Data Base (CNDDB) as of 4/11/2000 and USFWS as of 4/12/2000 (SECAL, 2000a, AFC, Appendix H) within six miles of the site. These species are geographically depicted in the AFC in Figure 8.2-1. Of these species, only two sensitive plant species, adobe sanicle and alkali milk vetch historically occurred within a mile of the Unit 7 project site. Occurrence of these plants was referenced by the CNDDB about a half-mile to the west around Potrero Hill in an area that is now urbanized.

# **BIOLOGICAL RESOURCES Table 1** **Sensitive Species\*** **(SECAL 2000a)**

<b>Sensitive Plants</b>	<b>Status**</b>
adobe sanicle ( <i>Sanicula maritima</i> )	FSC, 1B
alkali milk-vetch ( <i>Astragalus tener</i> var <i>tener</i> )	List 1B
beach layia ( <i>Lyia carnosa</i> )	FE, CE, List 1B
compact cobwebby thistle ( <i>Cirsium occidentale</i> var <i>compactum</i> )	FSC, List 1B
diablo helianthella ( <i>Helianthella castanea</i> )	FSC, List 1B
fragrant fritillary ( <i>Fritillaria liliacea</i> )	FSC, List 1B
Franciscan manzanita ( <i>Arctostaphylos hookeri</i> ssp <i>franciscana</i> )	FSC, List 1A
Kellogg's horkelia ( <i>Horkelia cuneata</i> ssp <i>sericea</i> )	FSC, List 1B
Marin western flax ( <i>Hesperolinon congestum</i> )	FT, CT, List 1B
Presidio clarkia ( <i>Clarkia franciscana</i> )	FE, CE, List 1B
Presidio manzanita ( <i>Arctostaphylos hookeri</i> ssp <i>ravenii</i> )	FE, CE, List 1B
robust spineflower ( <i>Chorizanthe robusta</i> var <i>robusta</i> )	FE, 1B
round-headed Chinese houses ( <i>Collinsia corymbosa</i> )	List 1B
San Bruno Mountain manzanita ( <i>Arctostaphylos imbricata</i> )	FSC, CE, List 1B
San Francisco Bay spineflower ( <i>Chorizanthe cuspidata</i> var <i>duspidata</i> )	FSC, 1B
San Francisco campion ( <i>Silene verecunda</i> ssp <i>verecunda</i> )	FSC, List 1B
San Francisco gumplant ( <i>Grindelia hirsutula</i> var <i>maritima</i> )	FSC, List 1B
San Francisco lessingia ( <i>Lessingia germanorum</i> )	FE, CE, List1B
San Francisco owl's-clover ( <i>Triphysaria floribunda</i> )	FSC, List 1B
San Francisco popcorn-flower ( <i>Plagiobothrys diffusus</i> )	CE

<b>Sensitive Wildlife</b>	<b>Status</b>
<b>Birds</b>	
California black rail ( <i>Laterallus jamaicensis coturniculus</i> )	FSC, CT
bank swallow ( <i>Riparia riparia</i> )	CT
saltmarsh common yellowthroat ( <i>Geothlypis trichas sinuosa</i> )	FSC
<b>Amphibians</b>	
California red-legged frog ( <i>Rana aurora draytonii</i> )	FT
<b>Fish</b>	
tidewater goby ( <i>Eucyclogobius newberryi</i> )	FE
<b>Invertebrates</b>	
Bay checkerspot butterfly ( <i>Euphydryas editha bayensis</i> )	CT
callippe silverspot butterfly ( <i>Speyeria callippe callippe</i> )	FE
mission blue butterfly ( <i>Icaricia icarioides missionensis</i> )	FE
monarch butterfly ( <i>Danaus plexippus</i> )	none
San Bruno elfin butterfly ( <i>Incisalia mosii bayensis</i> )	FE
tomales isopod ( <i>Caecidotea tomalensis</i> )	CSC

\* From the San Francisco North, San Francisco South, Hunters Point and Oakland West USGS quadrangles containing sensitive species location information from the CNDDB as of 11 May 2000.

\*\* - **Status Legend:** **FE:** Federally Endangered; **FT:** Federally Threatened; **FSC:** Federal Species of Concern; **FPE:** Federal Proposed Endangered; **FPT:** Federal Proposed Threatened; **FC:** Federal Candidate for Listing; **CE:** California Endangered; **CT:** California Threatened; **CPE:** California Proposed Endangered; **CSC:** California Species of Special Concern; **CFP:** California Fully-protected Species; **CR:** California Rare; California Native Plant Society (CNPS) **CNPS List 1A:** Presumed Extinct; **CNPS List 1B:** Rare or endangered in California and elsewhere.

## **LOCAL DESCRIPTION**

The proposed project is located at the intersection of Illinois and 23<sup>rd</sup> streets in an area currently dominated by industrial and commercial use, with some residential. Most of

the shoreline in this area has been modified with structures for terminal shipping or stabilized with rock or concrete. Prior to this development, the proposed power plant site and surrounding area was likely dominated by grassland, coastal scrub and marsh vegetation.

### **Power Plant Site and Construction Laydown Area**

The proposed Potrero Power Plant Unit 7 Project will be an addition to existing generating facilities that will occupy approximately 6.5 acres located in the south-central portion of the 20-acre Plant site between the existing substation and power plant facilities. There is no vegetation located at the proposed power plant site and construction laydown area. A small strip of vegetated area approximately 15 feet wide between the Mirant property and the riprap along the shoreline has been appropriately described in the AFC as disturbed vegetation predominated by non-native species.

### **Transmission Line**

The project proposes an underground transmission line to interconnect with PG&E's transmission system. From the existing Potrero Substation located immediately to the west of the Potrero Power Plant the line will extend 1.8 miles to the Hunters Point Substation. The proposed transmission cable route will extend approximately two-thirds of a mile from the site south along existing roads or utility routes and vacant lots. At Islais Creek the line will be installed via underground boring, then continue southeast along Cargo Way to the Hunters Point Substation. Islais Creek is a soft-bottomed channel that has been cut off upstream and is no longer a creek per se, but rather an estuary inlet. The boring under Islais Creek was performed as part of the Third Street Light Rail Project (MIRANT2001PSAComm, PSA Comment Sec. 4.3).

### **Natural Gas Supply Pipeline**

A natural gas pipeline tie-in will be made to an existing PG&E natural gas distribution line located on-site that currently serves the Potrero Power Plant. Therefore, no new lands will be occupied for this purpose outside the existing Potrero property.

### **Cooling Water Intake/Discharge and Wastewater**

A new cooling water intake structure will replace the existing intake and will be constructed at the shoreline adjacent to Unit 3. The circulating cooling water will be discharged via four discharge pipes with diffusion heads that will extend approximately 900 feet offshore from the plant site. Potable water will come from existing supplies. Storm water flows from the Unit 7 area will use the existing surface water drainage system, which will convey the flows to the existing outfalls to the San Francisco Bay and the existing San Francisco City sewer system. Because of its close proximity to the existing shoreline, no new lands will be occupied for these facilities outside the existing Potrero property that will affect terrestrial biological resources.

The construction of the new intake and discharge will result in the loss of coastal habitat, however these impacts will be addressed by the applicant in their Corp of Engineers 404 permit. This issue is discussed in the Aquatic Biological Resources testimony and will result in habitat compensation. For more information about the project's aquatic biological resources impacts, refer to the Aquatic Biological Resources section.

## **Locally Identified Species**

In addition to those sensitive species identified in Table 1 within a six-mile radius of the site, a field survey undertaken by the applicant on March 15, 2000, identified the following plant and animal species within or adjacent to the areas that will be occupied by the proposed Unit 7 project and ancillary facilities (SECAL 2000a, AFC, Table 8.2-1). None of the following plants or animals are identified sensitive species i.e. none are state or federally listed species, plants on the California Native Plant Society lists, etc.

**BIOLOGICAL RESOURCES Table 2**  
**Locally Identified Species**  
**(SECAL 2000a)**

<b><u>Scientific Name</u></b>	<b><u>Common Name</u></b>
<b>Plants</b>	
<i>Foeniculum vulgare</i>	fennel
<i>Heterotheca grandiflora</i>	telegraph weed
<i>Stellaria media</i>	common chickweed
<i>Trifolium repens</i>	white clover
<i>Trifolium pratense</i>	red clover
<i>Geranium dissectum</i>	geranium
<i>Oxalis pes-caprae</i>	Bermuda buttercup
<i>Plantago lanceolata</i>	English plantain
<i>Avena</i> sp.	wild oats
<b>Animals</b>	
<i>Actitis macularia</i>	spotted sandpiper
<i>Aechmophorus occidentalis</i>	western grebe
<i>Aythya affinis</i>	lesser scaup
<i>Aythya collaris</i>	ring necked duck
<i>Branta canadensis</i>	Canada goose
<i>Bucephala clangula</i>	common goldeneye
<i>Calidris mauri</i>	western sandpiper
<i>Calidris minutilla</i>	least sandpiper
<i>Casmerodius albus</i>	great egret
<i>Columba livia</i>	rock dove
<i>Corvus brachyrhynchos</i>	American crow
<i>Egretta thula</i>	snowy egret
<i>Fulica americana</i>	American coot
<i>Larus argentatus</i>	herring gull
<i>Larus californicus</i>	California gull
<i>Melanitta perspicillata</i>	surf scoter
<i>Oxyura jamaicensis</i>	ruddy duck
<i>Phalacrocorax penicillatus</i>	Brandt's cormorant
<i>Podiceps nigricollis</i>	western eared grebe

## **IMPACTS**

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### **DIRECT AND INDIRECT IMPACTS**

The California Environmental Quality Act Guidelines defines direct impacts as those impacts that result from the project and occur at the same time and place. Indirect impacts are caused by the project, but can occur later in time or farther removed in

distance, but are still reasonably foreseeable and related to the project. The potential impacts discussed below are those most likely to be associated with construction and operation of the project. None of the impacts described below are considered significant.

## **Power Plant Site and Laydown Area**

### **Disturbance or Removal of Existing Vegetation**

The Unit 7 Project site and construction laydown area are contained within the existing Mirant power plant property; therefore there will be no disturbance or removal of vegetation in this area.

### **Bird Collisions with Exhaust Stacks**

Bird collisions with buildings and utility structures can result in significant bird losses when these are located in areas where suitable habitat attracts bird populations or are placed along important migratory routes. Characteristics of large structures can increase the likelihood of collisions. Buildings with reflective glass; structures that are lighted at night; transmission lines or communications towers that are difficult for birds to see; and structures that emit electromagnetic waves can all confuse a bird's ability to navigate and orient itself. Bird collision fatalities in association with stacks are more associated with those that are relatively tall, ranging from 500 to 650 feet high (Goodwin 1975; Maehr et al. 1983; Weir 1974; Zimmerman 1975). Most bird collisions/deaths occur during migration in inclement weather. The collisions involve primarily night-migrating songbirds such as warblers, thrushes, vireos, tanagers, cuckoos, and sparrows.

Two 180-foot exhaust stacks will be constructed next to the existing 291-foot stack at the project site. These stacks are relatively less of a problem for bird collisions, when compared to buildings or other utility structures noted above because they are large and visible; would be shielded by the neighboring larger stack; do not have a reflective surface; and are less than 200 feet tall, so obstruction lighting will be minimal. To put this in the proper perspective, research on bird collisions and utility structures undertaken by the Electric Power Research Institute to date has focused on transmission lines, towers and wind turbines because collision problems with these structures have been noted by plant operators and workers, whereas bird collisions with stacks are apparently not appreciable (Richard Carlton, personal communication 2001).

In addition, there is very little shrub and tree vegetation in the project area that would provide suitable habitat for these species. Migratory waterfowl will use the entire shore area, at least for resting and foraging; however there are no significant waterfowl resource areas near the plant that would attract large numbers of birds, included threatened or endangered avian species.

Although bird collisions will occur, the numbers should be few and therefore, this impact is considered insignificant.



## Noise

The combined steady state sound level from the various components of Unit 7 at 400 feet were estimated at 58 dBA. It was projected that at that distance from the site no human noise-sensitive receptors would be affected by a 5 dBA increase above existing noise levels. In addition, the project has been designed to conform to applicable noise LORS during construction and operation. Given the existing and projected sound levels during construction and operation, as well as the absence of threatened and endangered species at the site or other important biological resources within the area surrounding the plant, noise level impacts to the local biota during construction and operation of the plant will be insignificant, so staff has not proposed any conditions of certification.

## Nitrogen and Sulfur Effects on Biota

The effect of air emissions on biological resources has been well studied in the case of acid producing emissions of sulfur dioxide (SO<sub>2</sub>) and nitrous oxides (NO<sub>x</sub>). However, there are many other changes in ecological processes that can be induced by primary air contaminants that have not been studied either because of the uncertainty and complexity inherent in quantitative analysis or because up until now the potential effects have been deemed relatively insignificant. It is generally assumed that the direct health effects of contaminated air on wildlife are adequately addressed by human based criteria, which is not always the case because of gross differences in exposure pathways and animal physiology (Freedman, 1989 and USEPA, 1989); however, because the nearest significant terrestrial biological receptors for the Potrero site (i.e., San Bruno Mountain and Heron's Head Park) are located to the south, outside the predominant plume direction, the measures taken to address protection of human receptors (see Public Health section) would be sufficient to protect terrestrial wildlife in these areas from direct health effects.

Staff also considered the indirect effects of emissions on ecological processes that can eventually impact plants and animals. These effects are difficult to quantify because they are influenced by a myriad of physical and biological factors that have not been fully characterized and that require assumptions, which may tend to overestimate (or underestimate) impacts (Stockwell 2000). Nevertheless, staff addressed the potential for dry and wet deposition of sulfur (S) and nitrogen (N) to affect the sensitive environment of San Bruno Mountain described above.

Currently one of the best studied of these potential effects in the Bay area is the effect of N deposition on nutrient poor serpentine habitats. Of the biological resources in the area surrounding the Unit 7 project site, the San Bruno Mountains support some of the few remaining remnants of serpentine habitat in the Bay area. Although this site is not considered to be a significant area for serpentine soils and habitats (Weiss, personal communication 2000), the San Bruno Mountains have been included in the Recovery Plan for Serpentine Soil Species of the San Francisco Bay Area (USFWS, 1998). In addition to the mission blue butterfly, (*Plebejus icarioides missionensis*, federally listed Endangered) the mountain is host to the federally listed Endangered San Bruno elfin butterfly (*Incisalia mossi bayensis*), and the federally listed Endangered callipe silverspot butterfly (*Speyeria callippe callippe*), and was historically inhabited by the Bay

checkerspot butterfly (*Euphydryas editha bayensis*, California listed Threatened), a species dependent on serpentine habitats.

The biological communities that exist on San Bruno Mountain are affected by indirect impacts to the physical environment that alter the quality of habitat resources. Among these, are changes in soil chemistry induced by dry and wet N deposition, and to a lesser degree S deposition that can in turn affect the composition of the biological community and biodiversity.

Assessing the impacts of N deposition as it relates to changes in soil fertility and the presence of endemic vegetation associated with state and federally listed animal species has been included among proposed measures for habitat restoration and management of serpentine habitats in the Bay area. The relationship between N deposition and alteration of grassland habitat and removal of grazing has also been studied by Weiss (1999) for the Bay checkerspot butterfly and by Allen et al. (1998) in coastal sage vegetation.

Staff was concerned that N deposition rates at sensitive biological receptors could be significant enough to alter native plant communities. The applicant in its response to CEC data requests (SEP2000DRes1, Data Response Nos. 20 to 22) calculated that the maximum deposition rates for S and N at the nearest sensitive biological receptors are those listed in Table 3 below for Unit 7 alone. These values were compared to United States Forest Service (USFS) significance criteria for Class I wilderness areas in kg/ha-yr. The predominant wind direction and plume direction for annual SO<sub>2</sub> and NO<sub>2</sub> concentrations is indicated to the NE of the project site in Figures 8.1-12 and 8.1-18, respectively of the AFC (SECAL, 2000a), which is not in the direction of the sensitive terrestrial biological receptors at San Bruno Mountain and Heron's Head Park.

**BIOLOGICAL RESOURCES Table 3**  
**Nitrogen (N) and Sulfur (S) Deposition Rates (kg/ha-yr) at Sensitive Biological Receptors (SEP2000DRes1, Data Response No. 20)**

<b>Pollutant/Location</b>	<b>USFS Significance Level<sup>1</sup></b>	<b>Project Impact (kg/ha-yr)</b>
Total S - San Francisco Bay	5	0.72
Total S - Heron's Head Park	5	0.13
Total S - San Bruno Mountain	5	0.05
Total N - San Francisco Bay	3	1.27
Total N - Heron's Head Park	3	0.28
Total N - San Bruno Mountain	3	0.10

<sup>1</sup>Peterson et al., 1992.

These USFS values are applied to Class I wilderness areas defined as those with more than 5,000 acres that were in existence as of August 7, 1977, or any later expansions made to these wildernesses. They were derived in order to comply with provisions of the Clean Air Act of 1977. However, the values themselves are generic condition classes set for ecosystem impacts to different vegetation types in California and can ostensibly be used for other areas. At levels less than those defined above, no injury is expected. Injury in this case is defined broadly at the ecosystem level to collectively

include processes such as plant metabolism and deposition effects on vegetation structure and diversity. The deposition rates provided in Table 3 above are 1 to 2 orders of magnitude less than the significance level generically defined for detrimental effects to shrubs and herbaceous plants and far below the levels of 10 – 15 kg/ha-yr deemed significant in Weiss's (1999) study of the impacts of N deposition on increases in soil fertility, which encourages invasion of non-native grasses and reduction in habitat suitability for the Bay checkerspot butterfly.

The effects of air emissions on soil conditions and their relationship to biological communities in San Bruno Mountain have not been studied as part of current habitat management efforts at the park; whereas other factors such as habitat fragmentation and weed management are more immediate concerns (Ron Weaver, personal communication 2001).

Moreover, concurrent with the development of Unit 7, Potrero Unit 3 is being fitted with Selective Catalytic Reduction (SCR) emission control technology, which will reduce NO<sub>x</sub> emissions by greater than 90% (SECAL, SEP 2000 Data Response Set 1, Data Response No. 21). Therefore, under the conditions described by the applicant in their response, there will actually be a net improvement in the potential impacts of N deposition from this source (Units 3 and 7) and no significant impacts are expected to occur.

### **Transmission Line**

The proposed transmission line would traverse areas that have already been disturbed by existing urban facilities, with the exception of Islais Creek. Directional boring will enter and exit approximately 180 feet from the channel outside of the vegetated strips along both banks, although the drilling area may extend to 170 feet from the channel. The patches of vegetation that exist among the rip rap along the banks provides some resting area for waterfowl that use the creek; however it does not contain any sensitive plant species. During construction there will be a disturbance to waterfowl that use this area; however this impact will be temporary and will not affect any threatened or endangered species. Therefore, significant impacts to biological resources in this area, including threatened and endangered species, are not expected to occur.

### **Natural Gas Pipeline**

Given that existing structures will be relied on for gas delivery; there will be no disturbance or removal of vegetated areas and therefore, no significant impacts to biological resources.

## **CUMULATIVE IMPACTS**

The California Environmental Quality Act defines cumulative impacts as “two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts.” (CEQA Guidelines, Cal. Code Regs, Title 14, §15355). Cumulative impacts can occur when individually minor but collectively significant projects take place at nearly the same time frame or compound over time.

Presently staff believes that the Potrero Power Plant Unit 7 Project will not contribute to significant cumulative impacts to terrestrial biological resources. However, given the

projected growth for power generating facilities in the San Francisco Bay area, along with other sources of the major contaminants of concern associated with these facilities, the long term cumulative effects of emissions on biota and ecological processes, both in the terrestrial and aquatic environments, should not be discarded by the applicant in their environmental management efforts. However, staff recognizes that current methods used to assess the nature and magnitude of cumulative effects like those caused by NO<sub>x</sub> emissions are limited and subject to error. A considerable effort is needed on a regional and local scale to estimate background conditions before the contribution of a single source to cumulative effects can be accurately assessed.

## MITIGATION

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### APPLICANT'S PROPOSED MITIGATION

Because the applicant did not identify significant impacts to terrestrial biological resources, impact avoidance or other mitigation measures were not proposed.

### STAFF'S RECOMMENDED MITIGATION

Although the applicant does not propose to disturb or remove vegetation for construction or operation of the Potrero Power Plant and ancillary facilities, in the event that these activities do affect adjacent vegetated areas, revegetation or landscaping of the project site should use only native vegetation that is suitable to the site, in compliance with the goals and policies set forth in the City and County of San Francisco's General Plan.

Staff currently believes that no mitigation is required to address the direct or indirect effects of air emissions on biota from Unit 7. This determination is based on the conditions provided in Table 21-1 of the Applicant's response to data requests that assumes retrofit of Unit 3 (SECAL, SEP 2000 Data Response Set 1, Data Response Nos. 20 to 22). Even though the Unit 7 project would contribute 0.10 kg/ha-yr<sup>1</sup> to the N deposition rates at San Bruno Mountain, staff feels that this impact would be adequately compensated by the reductions in NO<sub>x</sub> emissions from the Unit 3 retrofit.

## RESPONSE TO PUBLIC COMMENT ON THE PSA

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### GOLDEN GATE AUDUBON SOCIETY

*During a Preliminary Staff Analysis workshop, Arthur Feinstein implied that many birds will collide with the power plant stacks.*

**Response:** The assessment of impacts from bird collisions has been revised in the above **Impacts** discussion to indicate that while some collisions may occur, staff has concluded that the number is not considered significant.

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<sup>1</sup> As a point of reference, deposition rates of 0.13 kg-ha/yr on Coyote Ridge near the Metcalf Energy Center (MEC) represented 1.55% of ambient levels and were considered significant. The Metcalf Project is proposed to be located in the Santa Clara Valley within the Urban Service Area of south San Jose and just north of the town of Coyote.

## **COMPLIANCE WITH LAWS, ORDINANCES, REGULATIONS AND STANDARDS**

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Staff concludes that the proposed project will be in compliance with all laws, ordinances, regulations and standards applicable to terrestrial biological resources.

## **CONCLUSIONS**

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Construction and operation of the Unit 7 project should not have significant impacts on terrestrial biological resources.

## **CONDITIONS OF CERTIFICATION**

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Staff does not propose any conditions of certification for terrestrial biological resources.

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# **CULTURAL RESOURCES**

Testimony of Gary Reinoehl and Roger Mason

## **INTRODUCTION**

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This analysis discusses cultural resources, which are defined as the structural and cultural evidence of the history of human development and life on earth. Evidence of California's early occupation is becoming increasingly vulnerable due to the ongoing development and urbanization of the state.

Cultural resource materials may be found nearly anywhere in California: along the ocean coastline and on coastal islands, along rivers and streams, in coastal and inland valleys and lowlands, throughout the coastal and inland mountain ranges, and throughout the interior deserts. Cultural resources may be found on the ground or may be found at varying depths beneath the surface. In some areas of the state, a sequence of settlements on the same site may cover multiple layers of cultural resources. In other areas, the distribution of cultural materials may be much more dispersed and seemingly unrelated.

Cultural resources are significant to our understanding of our culture, history, and heritage. Critical to the analysis of cultural resources are the spatial relationships between an undisturbed cultural resource site and the surface environmental resources and features, and the analysis of the locational context of the resource materials within the site and beneath the surface. These relationships provide information that can be used to piece together the sequence of human occupation and use of an area, and they begin to create a picture of the former inhabitants and their environment.

Staff's primary concerns in its cultural resource analysis are to ensure that all potential impacts are identified, and that conditions are set forth that ensure no significant adverse impacts will occur. The identification of potential impacts to cultural resources from the proposed Potrero Power Plant Project (Unit 7) is required by the Siting Regulations of the California Energy Commission (Energy Commission) and by the California Environmental Quality Act (CEQA). Three aspects of cultural resources are addressed in staff's analysis: prehistoric archaeological resources, historic archaeological resources, and ethnographic resources.

## **PREHISTORIC RESOURCES**

Prehistoric archaeological resources are those materials relating to prehistoric human occupation and use of an area; these resources may include sites and deposits, structures, artifacts, rock art, trails, and other traces of Native American human behavior. In California, the prehistoric period began over 10,000 years ago and extended through the 18<sup>th</sup> century when the first Euro-American explorers settled in California.

## **HISTORIC RESOURCES**

Historic archaeological resources are those materials usually associated with Euro-American exploration and settlement of an area and the beginning of a written historical



record; they may include archaeological deposits, sites, structures, traveled ways, artifacts, documents, or other evidence of human activity. Under federal and state requirements, cultural resources must be greater than fifty years old to be considered of potential historical importance.

## **ETHNOGRAPHIC RESOURCES**

Ethnographic resources are those materials important to the heritage of a particular ethnic or cultural group, such as Native Americans or African, European, or Asian immigrants. They may include traditional resource collecting areas, ceremonial site, topographic features, cemeteries, shrines, or ethnic neighborhoods and structures.

## **LAWS, ORDINANCES, REGULATIONS, AND STANDARDS (LORS)**

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Cultural resources are indirectly protected under provisions of the federal Antiquities Act of 1906 (Title 16, United States Code, Section 431 et seq.) and subsequent related legislation, policies, and enacting responsibilities, e.g., federal agency regulations and guidelines for implementation of the Antiquities Act. The following laws, ordinances, regulations, standards, and policies apply to the protection of cultural resources in California. Projects licensed by the Energy Commission are reviewed to ensure compliance with these laws.

### **FEDERAL**

- National Environmental Policy Act (NEPA): Title 42, United States code, section 4321-et seq., requires federal agencies to consider potential environmental impacts of projects with federal involvement and to consider appropriate mitigation measures.
- National Historic Preservation Act, 16 USC 470, commonly referred to as Section 106, requires federal agencies to take into account the effects of their undertakings on historic properties through consultations beginning at the early stages of project planning. Regulations revised in 1997 (36 CFR Part 800 et. seq.) set forth procedures to be followed for determining eligibility for nomination, the nomination, and the listing of cultural resources in the National Register of Historic Places (NRHP). The eligibility criteria and the process are used by federal, state, and local agencies in the evaluation of the significance of cultural resources. Very similar criteria and procedures are used by the state in identifying cultural resources eligible for listing in the State Register of Historic Resources. Recent revisions to Section 106 in 1999 emphasized the importance of Native American consultation.
- Executive Order 11593, "Protection of the Cultural Environment," May 13, 1971 (36 Federal Register 8921), orders the protection and enhancement of the cultural environment through providing leadership, establishing state offices of historic preservation, and developing criteria for assessing resource values.
- American Indian Religious Freedom Act; Title 42, United States Code, Section 1996 protects Native American religious practices, ethnic heritage sites, and land uses.

## STATE

- Public Resources Code, Section 5024.1 establishes a California Register of Historical Resources; sets forth criteria to determine significance; defines eligible properties; and lists nomination procedures.
- Public Resources Code, Section 5097.5 states that any unauthorized removal or destruction of archaeological or paleontological resources on sites located on public land is a misdemeanor. As used in this section, “public lands” means lands owned by, or under the jurisdiction of, the state, or any city, county, district, authority, or public corporation, or any agency thereof.
- Public Resources Code, Section 5097.9 prohibits the interference with the free expression of Native American religion as provided in the United States Constitution and the California Constitution; nor cause severe or irreparable damage to any Native American sanctified cemetery, place of worship, religious or ceremonial site, or sacred shrine on public property, except on a clear and convincing showing that the public interest and necessity so require.
- Public Resources Code, Section 5097.99 prohibits obtaining or possessing Native American artifacts or human remains taken from a grave or cairn and sets penalties for these actions.
- Public Resources Code, Section 5097.991 states that it is the policy of the state that Native American remains and associated grave artifacts shall be repatriated.
- Public Resources Code, Section 21083.2 states that if a project may affect a resource that has not met the definition of an historical resource set forth in section 21084, then the lead agency may determine whether a project may have a significant effect on “unique” archaeological resources; if so, an EIR shall address these resources. If a potential for damage to unique archaeological resources can be demonstrated, such resources must be avoided; if they can not be avoided mitigation measures shall be required. The law also discusses excavation as mitigation; discussed the costs of mitigation for several types of projects; sets time frames for excavation; defines “unique and non-unique archaeological resources; provides for mitigation of unexpected resources; and sets financial limitations for this section.
- Public Resources Code, Section 21084.1 indicates that a project may have a significant effect on the environment if it causes a substantial adverse change in the significance of a historic resource; the section further defines a “historical resource” and describes what constitutes a “significant” historical resource.
- Administrative Code Title 14 Section 4307 states that no person shall remove, injure, deface or destroy any object of paleontological, archaeological, or historical interest or value.
- CEQA guidelines, Title 14, California Code of Regulations, Section 15126.4 “Consideration and Discussion of Mitigation Measures Proposed to Minimize Significant Effects” sub-section (b) discusses impacts of maintenance, repair, stabilization, restoration, conservation, or reconstruction of a historical resource. Subsection (b) also discusses mitigation through avoidance of damaging effects on any historical resource of an archaeological nature, preferably by preservation in

place, or by data recovery through excavation if avoidance or preservation in place is not feasible. Data recovery must be conducted in accordance with an adopted data recovery plan.

- CEQA Guidelines, Title 14, California Code of Regulation, Section 15064.5 “Determining the Significance of Impacts to Archaeological and Historical Resources”. Subsection (a) defines the term “historical resources.” Subsection (b) explains when a project may be deemed to have a significant effect on historical resources and defines terms used in describing those situations. Subsection (c) describes CEQA’s applicability to archaeological sites and provides a bridge between the application of the terms “historical” resources and a “unique” archaeological resource.
- CEQA Guidelines, Title 14 California Code of Regulations, Section 15064.7 “Thresholds of Significance.” This section encourages agencies to develop thresholds of significance to be used in determining potential impacts and defines the term “cumulatively significant.”
- California Penal Code, Section 622.5. Anyone who willfully damages an object or thing of archaeological or historic interest can be found guilty of a misdemeanor.
- California Health and Safety Code, Section 7050.5. If human remains are discovered during construction, the project owner is required to contact the county coroner.
- Public Resources Code, Section 5097.98. If the county coroner determines that the remains are Native American, the coroner is required to contact the Native American Heritage Commission, which is then required to determine the “Most Likely Descendant” to inspect the burial and to make recommendations for treatment or disposition of the remains and any associated burial items.

## **LOCAL**

Although the Energy Commission has pre-emptive authority over local laws, it typically ensures compliance with local laws, ordinances, regulation, standards, plans, and policies.

### **City and County of San Francisco**

Unreinforced Masonry Buildings (UMB) Code 2592 requires owners of unreinforced masonry buildings to have a structural analysis and if the building does not meet the minimum standards of the code and the exceptions, then the owner will structurally alter the building to conform to the code or have the building demolished.

San Francisco Planning Code Article 10 provides a mechanism to review permits and encourage the preservation of historic structures. This article allows the city to maintain a list of buildings and structures which have been “officially designated by agencies of the State or federal government.” This article also requires conformity between permits and this article.

## **ENVIRONMENTAL SETTING**

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### **REGIONAL DESCRIPTION**

The project area is located on the San Francisco Peninsula, a northward extension of the Santa Cruz Mountains that separates San Francisco Bay from the Pacific Ocean. The project area is an industrial area within the City of San Francisco.

### **PROJECT VICINITY DESCRIPTION**

The project is located on Potrero Point on the western shoreline of San Francisco Bay about 1.5 miles south of the Bay Bridge. Potrero Hill rises to an elevation of about 300 feet, one half mile west of the project. The project area is industrial with the former Pier 70 shipyard complex to the north and warehouses to the south. Another warehouse separates the project from a residential area at the base of Potrero Hill known as the Dogpatch Neighborhood. The project area is developed and covered by buildings and pavement.

Refer to the **PROJECT DESCRIPTION** section of this Final Staff Assessment for additional information and maps of the project development region and the project area.

### **PREHISTORIC SETTING**

The earliest documented occupation of the area between San Francisco and Monterey Bays dates to about 8,000 Before Present (BP). Prior to 2,000 BP archaeological evidence indicates that this area was occupied by small groups of hunter-gatherers that exploited both terrestrial and marine resources (primarily shellfish). Large shellmound sites began to be occupied around San Francisco Bay around 2,500 BP. These sites appear to be habitation sites with dense shell midden, flaked and ground stone tools, bone tools, beads, ornaments, charmstones, and burials. The shellmound sites were occupied until the arrival of the Spanish. The principal marine resource exploited was shellfish, consisting mostly of oysters and bentnose clams. The most important terrestrial resource was acorns gathered from oak trees in the fall. Acorn processing (leaching out the tannic acid and grinding into meal) requires a significant amount of labor. Use of acorns as early as 2,500 BP indicates intensification of resource procurement at a relatively early period in prehistory in this area. The beginning of the use of the shellmound sites around San Francisco Bay may correspond with the arrival of Utian speaking people from the Delta area. These Utian speakers were the ancestors of the Costanoans who occupied the San Francisco Bay area when the Spanish arrived in the area.

### **ETHNOGRAPHIC BACKGROUND**

The project area is in territory occupied by the Native American group known to the Spanish and twentieth century ethnographers as the Costanoan. The contemporary descendants of this group are members of the Ohlone Indian Tribe. The Costanoan group occupied the coast of California from San Francisco to Monterey and inland to include the coastal mountains from the southern side of the Carquinez Straits to the eastern side of the Salinas River south of Chalona Creek. Costanoan actually refers to a language family consisting of eight related languages. Each language was spoken by

a different ethnic group within a recognized geographical area. The political units within each ethnic group were tribelets. Tribelet population varied from 50 to 500 with the average being about 200 people. Each tribelet had one or more permanent villages and several temporary camps within its territory. Collecting and hunting parties lived in temporary camps when obtaining resources within the tribelet territory away from the village.

The project area is in the area occupied by speakers of the Ramaytush language. It is estimated there were about 1,400 speakers of this language in 1770. The Ramaytush speakers were divided into at least 10 tribelets.

Each tribelet had a chief and the office was inherited patrilineally. In particular, the chief fed visitors, directed ceremonial activities, organized hunting, fishing, and gathering, and directed warfare expeditions. Trade between the coastal Costanoan groups and the inland Yokuts groups involved the exchange of coastal products, such as mussels, abalone shells, dried abalone meat, and salt for inland products, such as piñon nuts.

Acorns from four species of oak were the most important plant food. Nuts, berries, seeds, and roots were also important. Costanoan groups practiced managed burning of chaparral to encourage sprouting of seed plants and improve browsing for deer and elk. The most important animals consumed were deer and rabbit. Steelhead, salmon, sturgeon, and lampreys were the most important fish and oysters and clams were the most important shellfish gathered from San Francisco Bay.

People lived in thatched dome houses with rectangular doorways and a central hearth. Other structures in a village included sweathouses, dance enclosures, and an assembly house. Technology included tule balsa canoes, bows and arrows, and baskets. Chipped stone tools were made from chert obtained locally and obsidian obtained in trade with other groups.

The Spanish established seven missions in Costanoan territory between 1770 and 1797. Due to introduced European diseases and a declining birth rate, the Costanoan population decreased from about 10,000 to 2,000 by 1832.

## **HISTORIC SETTING**

Spanish missionaries began their exploration and development of the missions in California in 1769, starting in San Diego and ending with the missions in San Rafael and Sonoma, in 1823. Mission San Francisco and the San Francisco Presidio (military post) were established in 1776. The Mexican government in the early 1830s closed the missions. Former mission lands were granted to soldiers and other Mexican citizens for use as cattle ranches. Ranching continued during the American period that began when the Treaty of Guadalupe Hidalgo was signed between Mexico and the United States in 1848. The Gold Rush of 1849 brought large numbers of Anglo-Americans to the area, resulting in the rapid expansion of San Francisco, which became the commercial entrepot for the region. Other towns in the bay area, such as Oakland and San Jose, developed rapidly after the arrival of the transcontinental railroad in 1869. The bay area towns provided commercial, warehousing, financial, and manufacturing services for the agricultural and mining areas further east. The earthquake of 1906

destroyed many nineteenth century buildings, especially in San Francisco, and resulted in a period of reconstruction and expansion of structures and infrastructure in the 1910s and 1920s.

The Potrero Point area was the site of early industrial activity associated with San Francisco. Between 1850 and 1950 there were powder magazines, a sugar processing plant, an electrical generating plant, a gas manufacturing plant, and a major shipyard within the immediate vicinity of the project area.

The first structures built at Potrero Point appear to have been powder magazines for the storage of gunpowder or blasting powder. Gibbon's Powder Magazine was established at Potrero Point at a location in the current project area in the late 1850s and consisted of a brick powder magazine, a dwelling, and a wharf (SEP2000Dres2, Data Response No. 155). The Hazard Powder Magazine was established nearby, but outside the current project area. There are reports that a Chinese fishing village was located at Potrero Point during the 1880s, but there is no specific information as to its location.

Claus Spreckels established the California Sugar Refinery at Potrero Point in 1881. Construction of this facility likely resulted in the partial destruction and burial of the powder magazine. The sugar refinery was established to refine and produce sugar made from Hawaiian sugar cane. It became the largest sugar refinery in the western United States and was a major industrial facility. Pre-1914 structures included several multi-story brick structures that served as a melt wash house, a melt filter house, warehouses, and wharves. The refinery was renamed the Western Sugar Refinery and operated until 1949 when it was purchased by its major competitor, the California and Hawaiian Sugar Refining Corporation (C & H). Most of the refinery structures were later demolished (SECAL2001b Appendix R3).

In 1901 Spreckles built Station A, a large brick structure that housed a steam powered electrical generating plant. It was soon purchased by San Francisco Gas & Electric which was renamed Pacific Gas & Electric. Station A was the largest steam electric plant west of the Rocky Mountains between 1903 and 1913 and supplied almost all of San Francisco's electricity during this period. Later, when cheaper hydroelectric power became available, Station A was used to supplement the hydroelectric power during periods of peak use. With continuing equipment upgrades Station A remained in operation until 1983 (SECAL2001b Appendix R2).

Before electricity was generally available, gas was used for lighting. Gas was manufactured from coal or oil until natural gas became available in 1929. The City Gas Company established the first gas manufacturing plant at Potrero Point in 1872. Ownership was transferred to San Francisco Gas & Electric in 1897. This company became Pacific Gas & Electric in 1906. The Potrero gas plant was one of two in the city that survived the 1906 earthquake and was expanded as the city was rebuilt. The Potrero gas plant was converted from using coal to oil in 1906. The Potrero gas plant was placed on standby status from 1929 to 1960. Most of it was subsequently demolished (SECAL2001b Appendix R2).

The San Francisco Yard (shipyard) is located adjacent to the project area to the north. It began as two competing companies that operated side by side. Union Iron Works

was established in 1883 and built ships used in the Spanish American War, including Admiral Dewey's flagship. Pacific Rolling Mills was established in 1896. By 1911 both shipbuilding operations had been purchased by Bethlehem Steel and were run as one large consolidated facility. Numerous warships used in both World War I and World War II were built at the San Francisco Yard. Bethlehem Steel operated the Yard until 1949 (SECAL2001b Appendix R1).

The underground transmission line proposed as part of the project passes through what was formerly Islais Creek Cove (now filled in). "Butchertown" was located south of Cargo Way and was built on platforms and wharves supported by pilings in the cove. This area contained slaughterhouses, stables, offices, saloons, and boarding houses. Butchertown was established by the meat-processing firm of William Dunphy and Associates in 1871 and continued in operation until 1906 when it was destroyed during the earthquake. This part of the cove was later filled (URS/Dames & Moore 2000:5).

In 1909 the Western Pacific Railroad built a 1,500 foot long wharf with track extending from the end of 25<sup>th</sup> Street (at Illinois Avenue at that time) in the area north of Islais Creek. The wharf was built to facilitate transport of rail cars across the bay to Oakland. The area around the wharf was later filled and reclaimed, but the wharf and tracks continued in operation until 1978.

## **RESOURCES INVENTORY**

### **Literature and Records Search**

Prior to preparation of the AFC, the Applicant conducted a literature search and reviewed site records and maps at the Northwest Information Center of the California Historic Resources Information System (CHRIS). A second records search was obtained in early 2001. The record searches did not identify any previously recorded prehistoric cultural resources within one-quarter mile of the proposed project (the power plant and the underground transmission line route). The record search indicated that two previous cultural resources investigations covered the current project area. One of these was a study by Wirth Associates (1979) for an earlier expansion of the Potrero Power Plant. Part of the brick foundation of one of the mid-nineteenth century powder magazines discussed in the Historic Setting section was found in a trench excavated in the northeastern part of the power plant (an area that will not be affected by the proposed project). This feature was not included in the records search results, indicating that a site record form had not been submitted to the information center.

A second cultural resources study was prepared for the 1998 EIR for the sale of PG&E power plants that included the Potrero Power Plant. This study did not identify any archaeological resources in the project area, but concluded that there was a low to moderate potential for buried prehistoric resources and a moderate to high potential for buried historic resources. The second records search identified several industrial buildings more than 50 years old in the project vicinity, mostly located west of Third Street. In addition, the I. M. Scott School, built in 1895 and located at 1060 Tennessee Street, is San Francisco Historical Landmark 138 (SEP2000Dres2, Data Response No. 152).

An additional record search for the project was conducted to identify underwater cultural resources, such as shipwrecks, that could be impacted by construction of discharge pipelines in the bay. The record search was performed using information on file at the State Lands Commission, U.S. Army Corps of Engineers, San Francisco Bay Conservation and Development Commission, and the Port of San Francisco. No shipwrecks or other underwater cultural resources were identified as a result of the record search (SEP2000Dres2, Data Response No. 155).

Previous evaluations of historic structures in the project area were consulted. These include an evaluation of structures on the power plant parcel by Ward Hill and Laurence Shoup (SECAL 2001b, Appendix R2) and an evaluation of structures in the Southern Waterfront survey area that included the adjacent Union Iron Works, Pier 70 Historic District by Carey & Co., Inc. (SECAL 2001b Appendix R1). Currently, the San Francisco Landmarks Preservation Authority Board is conducting a cultural resources survey of the Central Waterfront. The survey area includes the power plant property and is funded by a grant from the National Park Service administered by the Office of Historic Preservation. Results are not yet available.

### **Field Surveys**

The Applicant performed an archaeological survey of the Potrero Power Plant property and the underground transmission route. The Area of Potential Effect (APE) for archaeological resources was defined as the power plant parcel. The survey of the power plant was carried out on August 31, 1999 by archaeologist Mark Hale. Parallel transects 20 meters apart were walked by the surveyors where possible. However, the ground surface could not be seen because pavement and structures cover the entire property. Mark Hale performed the archaeological survey of the underground transmission line route on February 28, 2000. Most of the route follows city streets and the entire width of the street right-of-way was surveyed. A small portion of the route south of Islais Creek is not within a street right-of-way. Here a corridor 50 feet wide was surveyed. The area surveyed encompassed the entire underground transmission line route APE (SECAL 2001b, [8.3]:19-20).

The Applicant also performed an historic architectural resources survey. The APE for the historic architecture survey consisted of the power plant parcel plus all properties directly adjacent to the power plant parcel. Michael Corbett, architectural historian, and Denise Bradley, landscape historian performed the historic architecture survey on January 3, 2001 (SECAL 2001b, [8.3]:20). Denise Bradley performed additional survey of the Pier 70 area on January 27, 2001 (SECAL 2001b, [8.3]:20). Michael Corbett and Denise Bradley performed a windshield survey of the underground transmission route on January 23, 2001 to provide a characterization of the types and ages of the structures along the route (SECAL 2001b, [Appendix R]:R-10).

### **Power Plant Property**

The power plant property is completely developed and is covered by structures and pavement. Some of the property consists of fill placed to reclaim land from San Francisco Bay. Other areas have fill placed to raise the original land surface to create a level area for building. In one such area, the remnants of a powder magazine built in the late 1850s were discovered in an exploratory trench (Wirth Associates 1979). No archaeological resources were identified as a result of the Applicant's archaeological



surface survey, a predictable result, given the inability to see the original ground surface (SECAL 2001b, [8.3]: 19).

Because of the potential for encountering submerged buried cultural resources in the bay, the geotechnical boring and the sediment sampling along the proposed alignments for the water discharge structures was monitored by the Applicant's archaeological consultant. Eucalyptus fragments found in geotechnical Boring B-7 at a depth of 9 to 23 feet suggest the presence of a wood pile at this location. Small wood fragments were found in 8 of the 31 sediment samples. No other historical material was recovered. The eucalyptus wood pile and small wood fragments are interpreted as representing remnants of the East Wharf/Sugar Dock associated with the Western Sugar Refinery. The wharf was the only structure built in the water in the project area and was demolished sometime between 1950 and 1975. The eucalyptus wood pile may have supported the wharf. The small wood fragments probably represent remnants of the wharf material deposited on the bay floor after demolition (SEP2000Dres2, Data Response No. 155). It is not likely that historical material dating to prior to the twentieth century exists on the bay floor in the project area. This area was probably dredged in order to accommodate large ships carrying sugar that moored at the East Wharf. Vessels over 400 feet in length are shown moored at the East Wharf of the Western Sugar Refinery in photos dating to the 1930s and 1940s (SEP2000Dres2, Data Response No. 155).

Three groups of structures constructed more than 45 years ago are within the APE for historic architectural resources. These consist of structures on the power plant property associated with the Station A power plant and the Potrero gas plant, structures on the adjacent parcel to the north that are part of the Union Iron Works Pier 70 Historic District, and structures on the parcel to the south that were part of the Western Sugar Refinery (SECAL 2001b, [8.3]:2).

There are five structures on the power plant property over 45 years old. Three of the structures were part of the Station A power plant and consist of the large Station A building, the Pump House, and the Gate House. The Station A building, constructed in 1901, is a large unreinforced brick masonry structure 434 feet long and 65 feet tall with Classical architectural details on the exterior. The original building consisted of two long rooms oriented north-south with the boiler room (434 feet by 64 feet) on the east and the turbine room (434 feet by 57 feet) on the west. There was also a reinforced concrete office building attached as to the north side of the west façade. Extensive remodeling in 1930 included the addition of a large four-story concrete and steel frame switch house on the southern part of the west side. A new brick façade with Classical architectural details covered the addition and the original southern façade. However, as a result of the demolition of the boiler room in 1983, only about 50 percent of the original Station A building remains. The remaining part of the original Station A structure consists of the turbine room and the office. No turbines or other equipment remain inside the building. The Pump House and Gate House are east of the Station A building along 23<sup>rd</sup> Street. The Gate House, built in 1901, is a one story brick masonry building that was originally attached to the east wall of the boiler room, while the Pump House, built in 1930, is a steel frame structure on a deep concrete foundation covered with corrugated asbestos transite panels (SECAL 2001b Appendix R1).

The other two structures of historic age on the power plant property are the Compressor House and the Meter House. These are single story brick masonry buildings that were associated with the gas plant. The rest of the gas plant structures and facilities have been demolished. The meter house has a steel frame covered with foot thick brick walls. A brick dentil course wraps around the building at the eaves. The building rests on a concrete foundation and steel rafters and sleepers support the roof. The building is rectangular, and has nine bays along the long axis and three bays along the short axis. Each bay has a segmented arched window with granite sills. No equipment remains in the building. "Although there is a minimum of applied ornament on this building, it has the general proportions and character of a classical temple with its gabled ends and pilastered walls" (Mirant2001DRes4, Data Response No. 191).

The L-shaped Compressor House is a steel frame structure with a complex system of trusses. It has one-foot thick brick walls and concrete floor and roof. Exterior decoration consists of rusticated pilasters, framed doorways, and cornice bands. The east-west wing is nine bays long and the north-south wing is six bays long. Columns that support a Pratt truss define the sides of each bay. Other than a control panel and booth, no equipment remains in the building. "The design of the exterior refers to Renaissance and Baroque architecture" (Mirant2001DRes4, Data Response No. 191).

The Meter House and the Compressor House were part of the distribution process for gas after it was manufactured. The structures used in manufacturing gas have all been demolished. Gas was manufactured at the Potrero gas plant using coal from 1872 to 1906 and using oil and lamp black thereafter. Gas was extracted from coal by heating coal to more than 600 degrees Celsius in clay retorts. The expelled gas was collected in a pipe at the top of the retort. The gas was forced through water, which helped remove impurities such as tar and ammonia. The gas was further purified in an iron tank with shelves lined with slaked lime that absorbed ammonia, sulfur, and carbonic acid gases. The gas was stored in a holder or reservoir consisting of an enormous sheet iron tub placed upside down in a water-filled brick cistern. The gas was forced through the water and into the tub. The gas pressure forced the tub to rise and the heavy tub maintained the gas under pressure. A 1914 Sanborn fire insurance map shows the following structures (no longer extant) at the gas plant north of Humboldt Street after its conversion to oil and lamp black in 1906: wharves, pumphouses, an oil tank, 2 generator houses (one where oil was heated and one where lamp black was heated), a lamp black storage shed, scrubbers, brick purifier houses, purifier tanks, and several large holders, including one with a capacity of five million cubic feet (Mirant2001DRes4, Data Response No. 190).

South of Humboldt Street was the Meter House, another purifier, and two holders. In 1924 the Compressor House replaced the purifier and one of the holders. Only the Meter House, Compressor House, and the base of one of the holders remain today. The Meter House measured the amount of gas produced before it was distributed. It contained five large machines (no longer present). The Compressor House increased the gas pressure so the gas could be distributed. Much higher pressures were required in San Francisco, compared to other cities, because of the hills and distances to outlying areas, such as Richmond (Mirant2001DRes4, Data Response No. 190).

Some of the structures in the Union Iron Works Pier 70 Historic District are on the parcel adjacent to the north of the power plant. These structures are also known as the San Francisco Yard and consist of 23 industrial buildings/facilities used in shipbuilding. Structures include machine shops, powerhouses, warehouses, and offices built between 1896 and 1941. Piers, slips, and dry docks extend into San Francisco Bay. The earliest buildings are of brick masonry construction. Later buildings were constructed of concrete and metal. Metal buildings, many with gable roofs and monitors, are the most numerous.

There are three warehouses on the parcel south of the power plant at 435 23<sup>rd</sup> Street. The warehouses were associated with the Western Sugar Refinery. Two of the warehouses are of historic age, built in 1923 and 1929. Both warehouses are of steel frame construction erected on a reinforced concrete foundation. Reinforced concrete walls enclose the steel frame. There are steel industrial windows and ground level doors. The 1929 warehouse has two levels. The 1923 warehouse has a façade with simple pilasters and cornices. The 1929 warehouse has a façade with pilasters that terminate in Gothic buttress-like features at the top of the walls (Mirant2001DRes4, Data Response No. 188). The sugar refining plant and all other associated structures, except for the three warehouses, were demolished after the plant closed in 1948. Just prior to demolition of most of the structures in 1950, the sugar refinery complex consisted of sixteen structures, as well as water tanks, a fuel tank, wharves, rail spurs and roadways. Structures included several pre-1914 multi-story brick structures and seven one-story wooden warehouses, along with the later concrete and steel warehouses (Mirant2001DRes4, Data Response No. 189). The concrete and steel warehouses built in the 1920s were designed to improve storage conditions for sugar, which is difficult to keep clean and dry.

### **Underground Transmission Line**

No archaeological resources were identified as a result of the Applicant's archaeological surface survey of the underground transmission line route, a predictable result, given the inability to see the original ground surface.

Warehouses and industrial yards flank the route along Illinois Avenue from the power plant to Islais Creek. All except one of the warehouses post-date 1956. There is a rail spur line in the street. There is a grain elevator complex on the east side of Illinois Avenue south of Islais Creek. Portions of the complex were built in 1949, 1953, and 1969. It has been evaluated as ineligible for the NRHP, but potentially significant in a local survey (NRHP status code "5B3") (SECAL 2001b Appendix R1). A firehouse built in 1927 is located on the west side of Illinois Avenue. It has been evaluated as ineligible for an individual listing on the NRHP (SECAL 2001b Appendix R1). Post-1956 warehouses, post office facilities, industrial parks, a tank farm flank the rest of the route along Cargo Way, Jennings Street, and Evans Street, and the Hunters Point Power Plant originally built in 1913. The Hunters Point Power Plant has been evaluated as ineligible for the NRHP, but potentially significant in a local survey (NRHP status code "5B3") (SECAL 2001b Appendix R1).

Historical research indicates that "Butchertown," a slaughterhouse area in the late nineteenth century, was located south of Cargo Way along the underground

transmission route. The landward end of the Western Pacific Railroad wharf was located at the intersection of Illinois Avenue and 25<sup>th</sup> Street.

### **Native American Contacts**

The Applicant contacted the Native American Heritage Commission (NAHC) to obtain a list of concerned Native Americans living in the San Francisco area. The Applicant sent letters to the Native Americans describing the project and asked about concerns. No responses were received.

## **CATEGORIZATION OF IDENTIFIED CULTURAL RESOURCES**

Various laws apply to the treatment of cultural resources. These laws require the Energy Commission to categorize resources by determining whether they meet several sets of specified criteria. These categories then in turn influence the analysis of potential impacts to the resources and the mitigation that may be required to ameliorate any such impacts.

Under federal law, only historical or prehistoric sites, objects, or features, or architectural resources that are assessed by a qualified researcher as “important” or “significant” in accordance with federal guidelines need to be considered regarding potential impacts. The significance of historical and prehistoric cultural resources is judged in accordance with the criteria for eligibility for nomination to the National Register of Historic Places (NRHP) as defined in 36 CFR 60.4. If such resources are determined to be significant, and therefore eligible for listing in the National Register, as well as the California Register, they are afforded certain consideration under the National Historic Preservation Act and/or CEQA. The federal laws are only applicable to the Corp of Engineers permit process.

The National Register criteria state that “eligible historic properties” are: districts, sites, building, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association, and that (a) are associated with events that have made a significant contribution to the broad patterns of our history; or (b) that are associated with the lives of persons significant in our past; or (c) that embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or (d) that have yielded, or may be likely to yield, information important to history or prehistory. Isolated finds by definition do not meet these criteria. California has adopted a very similar set of criteria for assessing resources of statewide importance.

Under federal law, resources determined not to be significant, that is, not eligible for National Register listing, are subject to recording and documentation only, and are afforded no further protection. However, occasionally certain resources, although they may not be assessed as “significant,” may nonetheless be of local or regional importance such that mitigation may be warranted regardless of their assessed significance. Staff evaluates the survey reports and site records for any known resources located within or adjacent to the project APE to determine whether they meet the eligibility criteria.

The record and literature search and the walking surveys of the proposed project APE were conducted to identify the presence of any cultural resource sites or materials. Where resources were identified, additional evaluation was conducted to determine whether the resources are already listed on, or are potentially eligible for listing on, either the National Register of Historic Places (National Register) [36 CFR 800] or the California Register of Historic Resources. The determination of eligibility is made in compliance with the applicable provisions of the National Historic Preservation Act.

CEQA Guidelines now explicitly require the lead agency (in this case, the Energy Commission) to make a determination of whether a proposed project will affect "historical resources." The guidelines provide a definition for historical resources and set forth a listing of criteria for making this determination. These criteria are the eligibility criteria for the California Register of Historical Resources (CRHR) and are essentially the same as the eligibility criteria for the NRHP. In addition, as with the NRHP, historical resources must also possess integrity of location, design, setting, materials, workmanship, feeling, and association. Resources eligible for the CRHR may have less integrity than the resources eligible for the NRHP. If the criteria are met and the resource is determined eligible for the CRHR, the Energy Commission must evaluate whether the project will cause a "substantial adverse change in the significance of the historical resource," which the regulation defines as a significant effect on the environment.

CEQA also contains a section addressing "unique" archeological resources and provides a definition of such resources (Public Resources Code, Section 21083.2). This section establishes limitations on analysis and prohibits imposition of mitigation measures for impacts to archeological resources that are not unique. However, the CEQA Guidelines state that the limitations in this section do not apply when an archeological resource has already met the definition of a historical resource (Title 14, California Code of Regulations, Section 15064.5). Since staff has determined that the sites for which it is recommending mitigation meet the definition of historical resources, the prohibition does not apply to the mitigation discussed in this staff assessment.

Using the above criteria, the Applicant has recommended that the Compressor House and Meter House described in the AFC and in subsequent filings for the Potrero project meet the criteria for being an historical resource. In addition, they recommended that the two sugar warehouses and the Union Iron Works Pier 70 Historic District on adjacent properties, but within the project APE, have been evaluated as eligible for the NRHP and therefore also qualify as historical resources according to CEQA.

The Compressor House and Meter House are evaluated as eligible for the CRHR under Criterion A (associated with events that have made a significant contribution to the broad patterns of our history) because they are the only remaining representatives of the facilities used in the gas manufacturing process in San Francisco prior to 1929 (SECAL 2001b Appendix R2, page 10). Manufactured gas was critical to the region's development before 1929 when it was replaced by piped-in natural gas. In addition to being eligible under Criterion A, both buildings retain integrity of location, design, setting, materials, workmanship, feeling, and association when considered as individual buildings. However, when considered as part of the gas manufacturing process, the buildings have lost integrity of design (because almost all gas processing equipment

has been removed), some integrity of setting (because the other gas plant buildings have been demolished), materials (because the equipment has been removed), workmanship, (because the equipment has been removed), and feeling (because the equipment has been removed). The buildings retain integrity of location and association when considered as part of the gas manufacturing process. Although integrity is, for the most part, lacking in the context of the entire gas plant operation, the two buildings retain sufficient integrity as individual buildings and as representatives of the gas distribution portion of the gas plant operation to be eligible for the CRHR. Commission staff has reviewed the recommendations and has determined that the Compressor House and the Meter House are eligible for the California Register of Historical Resources.

The Union Iron Works Pier 70 Historic District consists of 23 buildings and structures associated with early industry and shipbuilding in San Francisco. These structures are located within the project APE for historic architecture and are on the parcel directly north of the Potrero Power Plant. The Pier 70 structures constitute an historic district that has been evaluated as eligible for the NRHP under Criteria A, B, and C (SECAL 2001b Appendix R1). The results of this evaluation have not been formally submitted to the Historic Resources Commission for a determination of eligibility for the CRHR or to the SHPO for a determination of eligibility for the NRHP. However, the City treats the district as if it is eligible and it is referred to locally as the Pier 70 Historic District. The Port of San Francisco is updating the evaluation with the intention of listing the district on the NRHP (SECAL 2001b, [8.3]:23).

The two sugar warehouses south of the Potrero Power Plant date to 1923 and 1929. They are the only remaining structures from the Western Sugar Refinery begun by the Spreckels family in 1881. The concrete and steel warehouses represented a great improvement over the earlier wood warehouses in providing a clean dry environment for sugar storage. These two warehouses have been evaluated as eligible for both the NRHP and the CRHR under Criterion A because of their association with the Western Sugar Refinery (1881-1948) and the development of the sugar industry in San Francisco (SECAL 2001b Appendix R3). The sugar industry was important in the early development of San Francisco and represents the importance of San Francisco's economic relationship with Hawaii. While other sugar companies had their administrative headquarters in San Francisco, the Western Sugar Company was the only one with a refinery in San Francisco.

The two warehouses retain integrity of location, design, materials, and workmanship. Only minor changes (including replacement of the steel sash windows with aluminum sash windows, walling up of a few of the windows and removal of an awning) have been made to the two structures. Because the other structures and buildings that were part of the sugar refinery have been demolished, there has been some loss of integrity of setting and feeling.

The Applicant found that Station A did not retain sufficient integrity to be eligible for the CRHR. Over 50 percent of the major building has been demolished and all of the equipment has been removed. In addition, the associated Gate House and Pump House were evaluated as ineligible as individual buildings. The Applicant relied on an evaluation of the Station A buildings prepared by architectural historian Ward Hill in

response to the requirements of the City's unreinforced masonry building code. Staff agrees that Station A and the associated buildings are not eligible for the CRHR as a district or as individual buildings. The resource will no longer be considered in this analysis.

The eucalyptus wood pile identified in the underwater inventory was found to be less than 50 years of age. The resource would not qualify for exceptional significance, so staff concludes that this resource does not meet the eligibility criteria for the CRHR. The resource will no longer be considered in this analysis.

The buried cultural resources identified in prior studies and in the historic research for this project are currently inaccessible and their eligibility for the CRHR can not be determined until after permitting of the project. These resources will continue to be considered in this analysis.

## **IMPACTS**

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Since project development and construction usually entail surface and subsurface disturbance of the ground, the proposed Potrero project has the potential to adversely affect both known and previously unknown cultural resources. Direct impacts are those which may result from the immediate disturbance of resources, whether from vegetation removal, vehicle travel over the surface, earth-moving activities, excavation or demolition. Indirect impacts are those which may result from increased erosion due to site clearance and preparation, or from inadvertent damage or outright vandalism to exposed resource materials due to improved accessibility. Cumulative impacts to cultural resources may occur if increasing amounts of land are cleared and disturbed for the development of multiple projects in the same vicinity as the proposed project.

The potential for the project to cause impacts to cultural resources is related to the likelihood that such resources are present and whether they are actually encountered during project development and construction activities. Although the existence of known cultural resources increases the potential for additional resources, the absence of known resources does not necessarily mean that unknown resources will not be encountered and that impacts will therefore not occur. In addition, the potential for discovery does not measure the significance of individual artifacts or other cultural resources present, since it is impossible to accurately predict what specific materials could be encountered. Furthermore, sometimes the full significance of discovered cultural resources can only be determined after they have been collected, prepared, and studied by professional archaeologists, historians and/or architectural historians.

## **POTENTIAL FOR PROJECT IMPACTS**

Because project-related site development and construction would entail subsurface disturbance of the ground, the proposed project has the potential to adversely affect previously unknown cultural resources. Although no archaeological sites have been recorded within one quarter mile of the proposed project, historical research indicates the potential for encountering buried features and artifacts from the historic period during the construction of the new power plant facilities and during trenching for the underground transmission line. In addition, historic-era buildings are present on the

power plant parcel and on adjacent parcels. Thus, there is a potential for impacts to both subsurface and aboveground historical resources. Although there is no specific indication of prehistoric archaeological sites in the APE, the entire shoreline of San Francisco Bay was heavily used by prehistoric Native American populations.

### **Power Plant Property**

Construction of Unit 7 will disturb about 6.5 acres of the existing 20 acre Potrero Power Plant property. The area where Unit 7 will be constructed is west of Unit 3 and south of the existing storage tanks (see SECAL 2000a, Figure 2-2). The five buildings of historic age, Station A, the Gate House, the Pump House, the Compressor House, and the Meter House, will be demolished as part of the project (see SECAL 2001b, New Figure 2-10C). All must be demolished or reinforced to comply with the San Francisco Unreinforced Masonry Building Ordinance. The Applicant states that the buildings will be demolished because they cannot be retrofitted for power plant use or relocated and they cannot be avoided. The small size of the existing property and the location of existing facilities constrain the location of the power plant facilities and structures to be built as part of the proposed project (Mirant2001DResCBE, Data Response No. 80). Even if the proposed project were redesigned to use only one turbine instead of two, the project footprint would only be reduced by about 10 to 15 percent, a reduction insufficient to allow preservation of the Compressor House and Meter House (Mirant2001DResCBE, Data Response No. 83).

Demolition of the Compressor House and Meter House will materially impair the significance of these historical resources and results in a "substantial adverse change in the significance of an historical resource". Therefore, the project will have a significant effect on the environment (CEQA Guidelines 15064.5(b)). Although mitigation measures, consisting of documentation using large format photography and a historical narrative, are proposed elsewhere in this section, such documentation, "in some circumstances,...will not mitigate the effects" of demolition "to a point where clearly no significant effect on the environment would occur" (CEQA Guidelines 15126.4(b)(2)). Thus, even with mitigation requiring documentation, the demolition of the Compressor House and Meter House will constitute a significant effect on the environment.

The construction of Unit 7 at the Potrero Power Plant will not require any demolition or alteration of the buildings that are included in the Pier 70 District. However, the construction of the new power plant and the demolition of the Station A and gas plant buildings will affect the integrity of setting, feeling, and association of the Pier 70 District, but this impact will not be significant. The structures to be demolished on the power plant property are from the period of significance of the Pier 70 District (1880-1945). The new facility, although industrial in nature, as are the current buildings, will be of a very different character than the existing structures. However, because the Pier 70 historic district is large (50 acres) and contains 23 structures, the alteration of the setting, feeling and association will be a minor alteration. The integrity of setting, feeling and association were not defined as important aspects in the eligibility of the resource. Consequently, the change in setting, feeling and association will not materially impair the eligibility of the Pier 70 District and this does not represent a significant effect on the environment.



The demolition of the Station A Power Plant structures (turbine room, pump house, and gate house) and the gas plant structures (Meter House and Compressor House), along with construction of the new Unit 7 power plant structures, would affect the setting and feeling of the sugar warehouses, but this impact will not be significant. These aspects of integrity are not important characteristics for the eligibility of the resources.

Construction of the new power plant will not diminish the integrity of setting and feeling of the two sugar warehouses to the point that it would affect their eligibility for the CRHR and does not materially impair the resources. Consequently, this does not represent a significant effect on the environment.

After demolition, construction of new Unit 7 facilities will require excavation for the foundations of the powerblock, the cooling water intake structure, and the cooling water discharge conduit (see SECAL 2001b, New Figure 2-10A). Offshore, dredging will be required for placement of the discharge extensions with diffusers. Existing disturbed areas within the power plant property will be used for construction laydown and construction parking. They will require minimal grading and placement of gravel.

There is the potential for historic period features and artifacts associated with the mid-nineteenth century powder magazines to be encountered during the excavations to be carried out as part of the project. In addition to the portion of a powder magazine encountered in a test trench by Wirth and Associates (1979), a “dwelling” associated with the magazines is mentioned in historic sources. It is possible that domestic refuse deposits associated with this dwelling could be encountered. If the resources are eligible for the CRHR, the impact from the project will materially impair the resources. Appropriate mitigation measures such as data recovery will be implemented to reduce the impact to less than significant.

### **Underground Transmission Line**

The underground transmission line will be installed by means of direct burial along a route within city streets from the Potrero Power Plant to the Hunters Point Switchyard over a distance of 9,400 feet. A six foot by six foot trench will be excavated and 8 inch diameter PVC pipe will be buried in the bottom of the trench. Conduit will be installed under Islais Creek by directional boring. Splice boxes, approximately 10 feet long by 10 feet wide by 8 feet high, will be installed along the underground transmission line about every 3000 feet to 6000 feet. Staging areas for the horizontal drilling will also be required on each side of Islais Creek. On the north side of the creek an area about 50 feet by 50 feet and on the south side of the creek an area about 25 feet by 25 feet will be excavated several feet below grade.

Trenching for the underground transmission line could impact buried historical material associated with “Butchertown” south of Cargo Way. Such material could consist of animal bone, butchers’ tools, building materials, and domestic refuse. Trenching for the underground transmission line along Illinois Avenue where it crosses 25<sup>th</sup> Street could impact buried portions of the Western Pacific Railroad wharf. If the resources are eligible for the CRHR, the impact from the project will materially impair the resources. Appropriate mitigation measures such as data recovery will be implemented to reduce the impact to less than significant.

## **CUMULATIVE IMPACTS**

Cumulative impacts to cultural resources in the project vicinity may occur if increasing numbers of structures of historic age are demolished and if subsurface archaeological deposits (both prehistoric and historic) are affected by other projects in the same vicinity as the proposed project. However, the largest group of industrial historical buildings remaining in the area is the Pier 70 Historical District, adjacent to the proposed project on the north. The City and Port of San Francisco are studying adaptive reuse of these structures as part of future development projects. Thus, these structures will likely be preserved as a result of future projects, rather than impacted. The other group of historic buildings in the area is the residential, commercial, and industrial buildings in the Dogpatch Neighborhood west of Third Street. No specific projects proposed for this area are known, although changes are likely.

Impacts to subsurface archaeological resources from the proposed project and other projects in the vicinity could occur. However, project proponents for this and future projects in the area can mitigate impacts to as yet undiscovered subsurface archaeological sites to less than significant by implementing mitigation measures requiring construction monitoring, evaluation of resources discovered during monitoring, and avoidance or data recovery for resources evaluated as significant (eligible for the CRHR or NRHP).

## **IMPACTS OF FACILITY CLOSURE**

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The anticipated lifetime of the Potrero Power Plant Unit 7 Project is expected to be approximately forty years. It is anticipated that upgrades or modifications made prior to the facility's closure might extend the life of the plant. Closure would be caused by either (1) a natural or manmade disaster or economic difficulty, or (2) planned orderly closure that will occur when the plant becomes economically non-competitive.

## **PLANNED CLOSURE**

At the time of planned closure, all then-applicable LORS will be identified and the Energy Commission-required closure plan will address compliance with these LORS. Generally, if no additional ground disturbance occurs during closure activities and all conditions of certification have been met, no impacts to cultural resources would be expected. However, actual potential impacts are likely to depend upon the final location of project structures in relation to existing resources, and upon the procedures used for the removal of project structures. Since the spatial relationship between the closure and removal of project structures and sensitive resources cannot be determined at this time, no conclusion can be drawn at this time with respect to the impact of facility closure on cultural resources.

## **TEMPORARY CLOSURE**

A contingency plan for temporary cessation of operation would be implemented that would ensure compliance with all applicable LORS.

## **UNEXPECTED PERMANENT CLOSURE**

If a site were abandoned, impact to cultural resources would be unlikely because there would be no immediate soil disturbances. Over time, depending on the need to disturb the ground to accomplish project closure and facility removal, some disturbance of known and/or previously unknown cultural resources might result.

## **COMPLIANCE WITH APPLICABLE LORS**

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The City of San Francisco has no specific LORS that apply to cultural resources apart from compliance with CEQA.

## **MITIGATION**

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For cultural resources, the preferred method of mitigation is for project construction to avoid areas where cultural resources are known to exist, wherever possible. Often, however, avoidance cannot be achieved, and other measures such as surface collection, subsurface testing, and data recovery must be implemented for archaeological resources and documentation must be implemented for historical structures. Mitigation measures are developed to attempt to reduce the potential for adverse project impacts on cultural resources to a less than significant level.

Adaptive use of buildings or the moving of buildings with rehabilitation in accordance with the Secretary of Interior's Standard would be a type of mitigation that would reduce the impact of the proposed project to less than significant. Demolition of buildings even with recordation will not reduce the impact of the proposed project to less than significant.

## **APPLICANT'S PROPOSED MITIGATION**

### **Archaeological Resources**

As recommended by the Applicant in the cultural resources Station A Amendment to the AFC, a subsurface testing program should be implemented to identify buried archaeological resources prior to construction (SECAL 2001b, [8.3]:26). They recommend boring within the areas of ground disturbance for the power plant construction, as well as along the route of the underground transmission cable. If archaeological resources are identified as a result of the boring, they would be evaluated for significance (CRHR eligibility). If a resource is evaluated as significant and avoidance is not feasible, the Applicant recommends preparation of a data recovery plan that specifies what scientifically consequential information can be provided by the resource and how such information will be recovered. The data recovery plan would then be implemented.

The Applicant also states that construction monitoring by a qualified archaeologist may be necessary, depending on the results of the test program. If archaeological material is observed by the monitoring archaeologist, ground disturbing activity would be halted in the vicinity of the find so that its significance (CRHR eligibility) can be determined. If

evaluated as significant, mitigation measures (avoidance or data recovery) would be developed in consultation with the CEC.

The Applicant recommends a worker education program to ensure that buried archaeological resources are recognized by construction crews. Such a program would include information about the kinds of archaeological material that could be encountered and the procedures to be followed if such material is discovered.

### **Historic Architectural Resources**

The Applicant recommends documentation of the Compressor House and the Meter House using Historic American Engineering Record (HAER) standards. These standards include large format photography of the structures, photo reproduction of historic plans and photos of the structures, and a descriptive and historical narrative. The Applicant recommends that the resulting documentation be archived in a local repository, such as the San Francisco Main Library or the California Historical Society.

The Applicant also recommends making historical items, such as machinery, available to local historical societies and museums. The Applicant has already committed to donate two reciprocating Worthington steam pumps from the Station A turbine room and a post vise grip, also from the Station A turbine room.

### **CCSF PROPOSED MITIGATION**

The City and County and County of San Francisco (CCSF) recommend that mitigation of the loss of the significant structures on the power plant site (the Compressor House and the Meter House) should consist of the following:

- Determine whether historical resources on the power plant property are eligible as part of an historic district.
- Identify and protect neighboring historic structures in the Pier 70 area.
- Record the structures to be demolished using Historic American Engineering Record (HAER) standards.
- Develop a salvage plan to provide for reuse of architectural elements and building materials.

The Applicant evaluated buildings on the power plant property using standard professional practices based on historic contexts provided by the National Park Service (NPS 1991, p. 8). Districts were considered in the analysis and links between buildings were identified in accordance with National Park Service guidance. Three districts were considered in the analysis: the Station A complex (significant, lacks integrity, Compressor House and Meter House individually eligible), the Western Sugar Refinery buildings (significant but lacks integrity, warehouses individually eligible), and the Pier 70 complex (significant, eligible district). Each of the districts considered is linked either by plan or physical development in accordance with NPS guidance (NPS 1991, p. 5). The Applicant has completed the consideration requested by the CCSF.

The Applicant has provided record forms of many of the Pier 70 buildings. This is identification of historic buildings in the Pier 70 area. CEQA does not require identifying all buildings adjacent to the project area. The Applicant has fulfilled their obligation

under the law to identify the historical resources that might be impacted by the project. The impact to the Pier 70 buildings is less than significant. No nexus has been identified between the project and the Pier 70 buildings that would require protecting the Pier 70 buildings as mitigation for the project impacts. Staff encourages Mirant to assist the CCSF in protecting and preserving the Pier 70 buildings through rehabilitation and adaptive reuse.

Staff (see Proposed Condition of Certification CUL-3) has recommended the third mitigation measure.

Mirant has recommended making historical items, such as machinery, available to local historical societies and museums. The Applicant has already committed to donate two reciprocating Worthington steam pumps from the Station A turbine room and a post vise grip, also from the Station A turbine room. These historic items are not significant and are not part of significant buildings. There is no required mitigation for items that are not significant. Mirant should be commended for contributing these items of historic interest to repositories. Staff encourages Mirant to work with the CCSF, museums, and other repositories to save other equipment and rare architectural elements such as the façade of the office associated with Station A that would otherwise be lost with the demolition of these non-significant buildings.

## **STAFF'S PROPOSED MITIGATION MEASURES**

Commission staff concurs with the mitigation measures proposed by the Applicant in the amended AFC. The proposed mitigation measures would apply to any potential for impacts to sensitive cultural resources in all areas affected by the project. Mitigation measures are derived from standard professional practice and they are based on the U.S. Secretary of the Interior's guidelines. The mitigation measures set forth in the conditions have been applied to previous projects before the Commission and they have proven successful in protecting some types of sensitive cultural resources from construction-related impacts while allowing the timely completion of many projects throughout California.

The potential for encountering eligible subsurface archaeological resources will be assessed by performing a test program using a bucket auger both in the power plant property and along the underground transmission line route. The Applicant has prepared a research design and testing plan to guide evaluation of any resources encountered during subsurface testing or construction. The plan provides research questions relevant to the kinds of buried archaeological resources that could be encountered and provides guidelines for making decisions about CRHR eligibility. This plan will expedite the evaluation process, especially for resources encountered during construction.

Staff also recommends construction monitoring for both the power plant and underground transmission cable. Adoption of staff's proposed conditions of certification will reduce the potential for adverse project impacts on subsurface cultural resources to a less than significant level, but may not reduce the impacts on above ground eligible historical resources to a less than a significant level.

Staff has adapted the Applicant's proposed mitigation measures into a series of conditions of certification, sometimes rewording for clarification and adding time frames and other requirements.

Staff's preferred mitigation for the two on-site historic buildings would be relocation to a nearby vacant property and rehabilitating them using the Secretary of Interior's Standards. This mitigation would reduce the impact to less than significant. Although staff has ascertained that it is feasible to move the buildings, at this time there is no surety that one or more nearby parcels of vacant land could be the permanent home for these buildings. Staff will explore the possible use of the nearby vacant parcels for relocation of the two historic buildings in an attempt to provide this surety at the evidentiary hearing. Should it become clear at the evidentiary hearing that one of the parcels can be used, staff has included a proposed condition of certification that would require the relocation.

Should use of the nearby vacant parcels not prove possible by the evidentiary hearing, documentation of the two CRHR eligible buildings (the Compressor House and the Meter House) using HABS/HAER standards is recommended. In addition, information about the history of these buildings should be provided to the public, both through documents for the general public distributed to local museums, libraries and schools and through an on-site interpretive kiosk. The Applicant indicated that it would not be possible to construct an interpretive kiosk along Illinois Street. Staff recommends that it be constructed along a trail in the proposed park along 23<sup>rd</sup> Street. Staff has included a proposed condition of certification that would require the establishment of this kiosk in a place that has public access that is adjacent to, or is in close proximity to, the plant site. However, this mitigation measure will not reduce the impacts of demolition of the two structures to less than significant (CEQA Guidelines 15126.4(b)(2)).

## **RESPONSE TO PUBLIC AND AGENCY COMMENTS ON THE PSA**

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### **CITY AND COUNTY OF SAN FRANCISCO (CCSF)**

**CCSF-5A:** *The gas plant buildings should have been evaluated by "a qualified technology consultant who has expertise in the production of electricity from manufactured gas."*

**Response:** It should be noted that electricity was not produced from manufactured gas. The gas was manufactured from coal (after 1906 oil was used) and was distributed in a pipeline network throughout the city for use in gas lamps and for cooking and heating. A qualified consultant who meets the Secretary of the Interior's standards for an architectural historian performed the evaluation of the gas plant buildings. There is no technology to evaluate; all equipment has been removed, except for one control panel in the Compressor House. A complete description of the technological process of gas manufacturing was provided by the Applicant (Mirant2001Dresp4, Data Response No. 190) and is summarized in this document in the Resources Inventory of the Power Plant Property section.

**CCSF-5B:** *Staff's Proposed Mitigation Measures – Recording the gas plant structures using HAER standards and displaying information about the site in a public kiosk are not adequate to mitigate the demolition of the two CRHR eligible gas plant structures. CCSF recommended that the applicant determine whether the site is part of an eligible historic district, identify and protect neighboring historic structures in the Pier 70 area, record the structures using HAER standards, and develop a salvage component as part of the demolition plan so that architectural elements and building materials can be reused.*

**Response:** This is discussed in the CCSF proposed mitigation section. The historic structures in the Pier 70 area were previously identified in 1994. At that time architectural historians from Carey & Co. concluded that the 23 structures comprising the San Francisco Yard (shipyard) constitute a historic district that has been evaluated as eligible for the National Register of Historic Places (SECAL 2001b, Appendix R). The district was evaluated as eligible under Criterion A (association with important events in history) and some of the structures were evaluated as individually eligible under Criterion C (architecturally distinctive). The report contains DPR 523 forms for the district and individual structures.

Staff has already recommended recording the gas plant structures using HAER standards (see Proposed Condition of Certification CUL-3).

Mirant has recommended making historical items, such as machinery, available to local historical societies and museums. The Applicant has already committed to donate two reciprocating Worthington steam pumps from the Station A turbine room and a post vise grip, also from the Station A turbine room. These historic items are not significant and are not part of significant buildings. There is no required mitigation for items that are not significant. Mirant should be commended for contributing these items of historic interest to repositories. Staff encourages Mirant to work with the CCSF to save other rare architectural elements such as the façade of the office associated with Station A that would otherwise be lost with the demolition of these non-significant buildings.

**CCSF-5B (cont.):** *A historical resources survey of the Central Waterfront being conducted by the Landmark Preservation Advisory Board was not mentioned in the PSA.*

**Response:** The results are not yet available, but the survey has been noted in the Literature and Records Search section. CCSF commented that the significance of and mitigation measures proposed for the historical structures be reviewed by the State Historic Preservation Officer (SHPO). However, in the case of environmental analysis under the California Environmental Protection Act, determinations of eligibility for the California Register are made by the lead agency (in this case, the Energy Commission), not by the SHPO. The Energy Commission also determines what conditions of certification (similar to mitigation measures) should be required, based on recommendations from its staff.

**CCSF-5B (cont.):** *The Landmarks Preservation Advisory Board (LPAB) was not consulted about the historical structures on the property.*

**Response:** The CCSF is an intervener and has access to all documents that have been docketed with the CEC. The LPAB is part of CCSF and therefore can review and comment on all documents.

**CCSF-5C:** *Appropriate mitigation for the demolition of the gas plant structures (Meter House and Compressor House) should include requiring the Applicant to contribute to the seismic mitigation of Pier 70 historical structures.*

**Response:** As previously noted, the impact to the Pier 70 buildings is less than significant. No nexus has been identified between the project and the Pier 70 buildings that would require protecting the Pier 70 buildings as mitigation for the project impacts.

## **PIER 70 ADVISORY GROUP (P70)**

The Pier 70 Advisory Group suggested several mitigation measures for cultural resources.

**P70-5A:** *The impact to historic resources on the power plant site should be mitigated by providing financial resources to identify and protect neighboring historic structures in the Pier 70 area. Additionally, prior to demolition, the resources on the power plant site should be recorded in accordance with Historic American Engineering Record standards.*

**Response:** This is discussed in the CCSF proposed mitigation section. The historic structures in the Pier 70 area were previously identified in 1994. At that time architectural historians from Carey & Co. concluded that the 23 structures comprising the San Francisco Yard (shipyard) constitute a historic district that has been evaluated as eligible for the National Register of Historic Places (SECAL 2001b, Appendix R). The district was evaluated as eligible under Criterion A (association with important events in history) and some of the structures were evaluated as individually eligible under Criterion C (architecturally distinctive). The report contains DPR 523 forms for the district and individual structures.

Staff has already recommended recording the gas plant structures using HAER standards (see Proposed Condition of Certification CUL-3).

**P70-5B:** *A reasonable mitigation measure for the impacts caused by demolition of the NRHP eligible Meter House and Compressor House would be to request that an amount equal to the estimated costs for the seismic mitigation of these two buildings be contributed to seismic mitigation of Pier 70 historic resources, including, but not limited to, Buildings 104, 111, and 113.*

**Response:** As previously noted, the impact to the Pier 70 buildings is less than significant. No nexus has been identified between the project and the Pier 70 buildings that would require protecting the Pier 70 buildings as mitigation for the project impacts.

**P70-5C:** *The Power Plant should create or be a major contributor to an educational exhibition on central waterfront development history that has been proposed for the Pier 70 area.*



**Response:** No nexus has been identified between the project and the Pier 70 buildings that would require contributing to exhibits in the Pier 70 area as mitigation for project impacts.

**P70-6:** *Mirant should retain a Designated Resource Specialist to develop an Archaeological Resources Treatment Plan and to monitor on- and off-site excavation activities.*

**Response:** The Applicant has prepared a research design and testing plan to guide evaluation of any resources encountered during subsurface testing or construction. The plan provides research questions relevant to the kinds of buried archaeological resources that could be encountered and provides guidelines for making decisions about CRHR eligibility. This plan will expedite the evaluation process, especially for resources encountered during construction. In addition, Proposed Condition of Certification CUL-5 requires the applicant to prepare a Cultural Resources Monitoring and Mitigation Plan (CRMMP). Staff has already recommended monitoring during earth-disturbing activities on the power plant site and for the underground transmission line (see Proposed Condition of Certification CUL-8). The monitoring will be supervised by a qualified Cultural Resources Specialist (CRS) (see Proposed Condition of Certification CUL-1).

**P70-7A:** *Demolition would be inconsistent with the Draft Preservation Element of the General Plan.*

**Response:** The Preservation Element encourages, but does not require, preservation of historic structures unless the Board of Supervisors has designated the property or properties as an historical landmark or an historical district. The gas plant structures to be demolished have not been so designated.

**P70-7B:** *Mirant should fund preservation activities at Pier 70 and in the Dogpatch Neighborhood.*

**Response:** No nexus has been identified between the project and the Pier 70 buildings nor the Dogpatch Neighborhood that would require contributing to preservation activities in these areas as mitigation for project impacts.

## **BAY CONSERVATION AND DEVELOPMENT COMMISSION (BCDC)**

**BCDC-17 (Response to BCDC Report received October 10, 2001):** *To reduce impacts to historic resources, the applicant should employ adaptive use of on site buildings to the maximum extent feasible.*

**Response:** The applicant has stated that the gas plant buildings must be demolished in order for the new power plant to be constructed within the limits of the available property (see the discussion of the Power Plant Property in the Potential for Project Impacts section).

## CONCLUSIONS AND RECOMMENDATION

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### CONCLUSIONS

The results of previous testing on the power plant property indicate that buried archaeological resources from the historic period could be encountered during construction. In addition, there are two historical structures on the power plant property (the Meter House and the Compressor House) that have been evaluated as eligible for the CRHR, but that are proposed to be demolished to make way for the new Unit 7 facilities. If the following conditions of certification are properly implemented, the project will comply with applicable laws, ordinances, regulations, and standards.

Staff has determined that demolition of the Compressor House and the Meter House will result in an unmitigable significant impact, even with implementation of staff's proposed condition of certification CUL-18. If staff's proposed condition of certification CUL-17 can be shown to be feasible at the evidentiary hearing and is adopted by the Commission, the project will result in a less than significant impact for cultural resources, considering the adoption of all other proposed cultural conditions of certification.

### RECOMMENDATION

Staff recommends that the Commission adopt the following proposed conditions of certification, which incorporate the mitigation measures discussed above.

### PROPOSED CONDITIONS OF CERTIFICATION

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**CUL-1** Prior to the start of any ground disturbance, the project owner shall provide the California Energy Commission (Commission) Compliance Project Manager (CPM) with the name and statement of qualifications of its Cultural Resource Specialist (CRS), who will be responsible for implementation of all cultural resources Conditions of Certification. An alternate CRS may be also be proposed to carry out the duties of the CRS if that person is unable to fulfill those duties for some reason. The alternate CRS must also meet the requirements below

Protocol: The statement of qualifications for the CRS shall include all information needed to demonstrate that the CRS meet the minimum qualifications set forth below, including the following:

- a) a graduate degree in anthropology, archaeology, California history, cultural resource management, or a comparable field;
- b) at least three years of archaeological resource mitigation and field experience in California; and
- c) at least one year's experience in each of the following areas:
  - 1. leading archaeological resource field surveys;

2. leading site and artifact mapping, recording, and recovery operations;
3. marshalling and use of equipment necessary for cultural resource recovery and testing;
4. preparing recovered materials for analysis and identification;
5. determining the need for appropriate sampling and/or testing in the field and in the lab;
6. directing the analyses of mapped and recovered artifacts;
7. completing the identification and inventory of recovered cultural resource materials; and
8. preparing appropriate reports to be filed with the receiving curation repository, the State Historic Preservation Officer (SHPO), and the appropriate regional archaeological information center(s).

The statement of qualifications for the CRS shall include:

- a) a list of specific projects the CRS has previously worked on;
- b) the role and responsibilities of the CRS for each project listed; and
- c) The names and phone numbers of contacts familiar with the CRS's work on these referenced projects.

**Verification:** At least 90 days prior to the start of project earth disturbing activities, the project owner shall submit the name and statement of qualifications of its CRS, and alternate if desired, to the CPM for review and approval.

At least 10 days, but no more than 30 days prior to the start of any ground disturbance or cultural resources recordation, the project owner shall confirm in writing to the CPM that the approved CRS will be available at the start date and is prepared to implement the cultural resource Conditions of Certification.

At least 10 days prior to the termination or release of a CRS, the project owner shall obtain CPM approval of the replacement CRS by submitting to the CPM the name and a statement of qualifications of the proposed new CRS.

**CUL-2** Prior to the start of any ground disturbing activities, or demolition, the project owner shall provide the California Energy Commission (Commission) Compliance Project Manager (CPM) with the name and statement of qualifications of an architectural historian who will prepare Historic American Engineering Record (HAER) level documentation of the Meter House and Compressor House.

**Protocol:** The statement of qualifications for the architectural historian shall include all information needed to demonstrate that the architectural historian, including:

- a) meets the Secretary of Interior's Professional Qualifications for architectural history;

- b) has at least 5 years experience in recording 19<sup>th</sup> century architectural buildings;
- c) names and phone numbers of contacts familiar with the architectural historian's work on these referenced projects.

**Verification:** At least 90 days prior to the start of project earth disturbing activities, the project owner shall submit the name and statement of qualifications of its architectural historian to the CPM for review and approval.

**CUL-3** Prior to demolition or alteration of the Meter House or the Compressor House, the architectural historian will prepare Historic American Engineering Record (HAER) level documentation of the Meter House and Compressor House. This will include large format photography (views of overall site, individual buildings, and building details), a descriptive and historical narrative, and a historic context for the pre-1930 gas manufacturing process.

**Verification:** At least 30 days prior to demolition or alteration of the Meter House or the Compressor House, a copy of the HAER recording of the Meter House and Compressor House will be provided to the CPM for review and approval.

Within 30 days after CPM approval, the project owner will provide a copy of the transmittal letters to the CPM of the HAER documentation to the San Francisco Public Library and the California Historical Society.

**Cul-4** Prior to the start of any ground disturbance, the project owner shall provide the CRS and the CPM with maps and drawings showing the footprint of the power plant and all linear facilities. Maps provided will include the USGS 7.5 minute topographic quadrangle map and a map at an appropriate scale (e.g., 1:2000 or 1" = 200') for plotting individual artifacts. If the designated cultural resource specialist requests enlargements or strip maps for linear facility routes, the project owner shall provide them. In addition, the project owner shall provide a set of these maps to the CPM at the same time that they are provided to the specialist. If the footprint of the power plant or linear facilities changes, the project owner shall provide maps and drawings reflecting these changes, to the CRS and the CPM within five days. Maps shall show the location of all areas where surface disturbance may be associated with project related access roads, and any other project components.

**Verification:** At least 75 days prior to the start of ground disturbance on the project, the project owner shall provide the CRS and the CPM with the maps and drawings. Copies of maps or drawings reflecting changes to the footprint of the power plant and/or linear facilities shall be submitted to the CRS and the CPM within five days of the changes.

**CUL-5** Prior to the start of ground disturbance; the CRS shall prepare, and the project owner shall submit to the CPM for review and approval, a Cultural Resources Monitoring and Mitigation Plan (CRMMP), identifying general and specific measures to minimize potential impacts to buried cultural resources. Approval of the CRMMP, by the CPM, shall occur prior to any disturbance.

Protocol: The Cultural Resources Monitoring and Mitigation Plan shall include, but not be limited to, the following elements and measures.

- a. A proposed research design that includes a discussion of questions that may be answered by the mapping, data and artifact recovery conducted during monitoring and mitigation activities, and by the post-construction analysis of recovered data and materials.
- b. Specification of the implementation sequence and the estimated time frames needed to accomplish all project-related tasks during the pre-construction, construction, and post-construction analysis phases of the project.
- c. Identification of the person(s) expected to perform each of the tasks; a description of each team member's qualifications and their responsibilities; and the reporting relationships between project construction management and the mitigation and monitoring team.
- d. A discussion of the inclusion of Native American observers or monitors, the procedures to be used to select them, and their role and responsibilities.
- e. A discussion of any measures such as flagging or fencing, to prohibit or otherwise restrict access to sensitive resource areas that are to be avoided during construction and/or operation, and identification of areas where these measures are to be implemented. The discussion shall address how these measures will be implemented prior to the start of construction and how long they will be needed to protect the resources from project-related effects.
- f. A discussion of the location(s) where monitoring of project construction activities is deemed necessary by the CRS. The CRS will determine the size or extent of the areas where monitoring is to occur and will establish the percentage of the time that the monitor(s) will be present, however monitoring shall be conducted full time in the specified areas that follow.
- g. A discussion of the requirement that all cultural resources encountered will be recorded and mapped (may include photos) and that all cultural materials recovered as part of a discovery or data recovery will be collected for analysis and eventual curation into a retrievable storage collection in a public repository or museum. The public repository or museum must meet the standards and requirements for the curation of cultural resources set forth at Title 36 of the Federal Code of Regulations, Part 79.
- h. A discussion of the availability and the CRS's access to equipment and supplies necessary for site mapping, photographing, and recovering any cultural resource materials encountered during construction.
- i. Identification of the public institution that has agreed to receive any data and cultural resources recovered during project-related monitoring and mitigation work. Discussion of any requirements, specifications, or funding needed for curation of the materials to be delivered for curation and how they will be met. Also the name and phone number of the contact person at the institution shall be included.

**Verification:** At least 60 days prior to the start of ground disturbance, the project owner shall provide the Cultural Resources Monitoring and Mitigation Plan, prepared by the CRS, to the CPM for review and approval.

**CUL-6** Prior to the start of ground disturbance, the CRS shall prepare an employee training program. The project owner shall submit the cultural resources training program to the CPM for review and approval.

**Protocol:** The training program shall discuss the potential to encounter cultural resources in the field, the sensitivity and importance of these resources, and the legal obligations (state and/or federal as appropriate) to preserve and protect such resources. Components of the program may include a video or other audio/visual presentation and may be combined with other training programs prepared for biological resources, paleontologic resources, hazardous materials, or any other areas of interest or concern. Required components of the program include: 1) a clearly identifiable decal/sticker to be worn on the hardhats of those workers that have completed the training, 2) a method of verification that those individuals who have received the training acknowledge their responsibilities and the possible penalties if the resource protection measures are not followed, 3) hands-on presentations by the cultural resources specialist or cultural resources monitor demonstrating some of the most common cultural materials that would be encountered, and 4) a handout that includes information on the above required elements and a set of resource reporting procedures and work curtailment procedures that workers are to follow if previously unknown cultural resources are encountered during project activities and a statement that the CRS has the ability to stop work when cultural resources are discovered.

**Verification:** At least 60 days prior to the start of ground disturbance; the project owner shall submit to the CPM for review and approval, the proposed employee training program, the set of reporting procedures, and the work curtailment procedures that the workers are to follow if previously unknown cultural resources are encountered during construction. The project owner shall provide the name and resume of the individual(s) performing the training.

**CUL-7** Prior to the start of ground disturbance; and throughout the project construction period as needed for all new employees, the project owner shall ensure that the designated cultural resource trainer(s) provide(s) the CPM-approved cultural resources training to all project managers, construction supervisors, and workers. The project owner shall ensure that the designated trainer provides the workers with the CPM-approved set of procedures for reporting any sensitive resources that may be discovered during project-related ground disturbance and the work curtailment procedures that the workers are to follow if previously unknown cultural resources are encountered during construction.

**Verification:** Within 7 days after the start of ground disturbance, the project owner shall provide the CPM with documentation that the designated cultural resources trainer(s) has/have provided to all project managers, construction

supervisors, and workers hired before the start of construction the CPM-approved cultural resource training and the set of reporting and work curtailment procedures.

In each Monthly Compliance Report, after the start of construction, the project owner shall provide the CPM with documentation that the designated cultural resource trainer(s) has/have provided to all project managers, construction supervisors, and workers hired in the month to which the report applies, the CPM-approved cultural resources training and the set of resource reporting and work curtailment procedures.

**CUL-8** The CRS or the CRS's delegated monitor(s) shall have the authority to halt or redirect construction if previously unknown cultural resource sites or materials are encountered during project construction related vegetation clearance or earth disturbing activities or project site preparation.

If such resources are found, the CRS shall contact the CPM as soon as possible for a determination of significance.

If such resources are found and the CPM determines that they are or may be significant, the halting or redirection of construction shall remain in effect until:

1. the specialist, the project owner, and the CPM have conferred and determined what, if any, data recovery or other mitigation is needed; and
2. any needed data recovery and mitigation has been completed.

The CRS, the project owner, and the CPM shall confer within five working days of the notification of the CPM to determine what, if any, data recovery or other mitigation is needed.

If data recovery or other mitigation measures are required, the CRS and team members shall monitor construction activities and implement the agreed upon data recovery and mitigation measures, as needed.

All required data recovery and mitigation shall be completed expeditiously unless all parties agree to additional time.

**Verification:** At least 30 days prior to the start of ground disturbance, the project owner shall provide the CPM with a letter confirming that the CRS and/or alternate CRS and delegated monitor(s) have the authority to halt construction activities in the vicinity of a cultural resource find.

**CUL-9** Prior to the start of ground disturbance; and each week throughout project construction, the project owner shall provide the CRS with a current schedule of anticipated project activity in the following month and a map indicating the area(s) where the construction activities will occur. The CRS shall consult daily with the project superintendent or construction field manager to confirm the area(s) to be worked on the next day(s).

**Verification:** At least 10 days prior to the start of ground disturbance, and in each Monthly Compliance Report thereafter, the project owner shall provide the

CPM with a copy of each weekly schedule of the construction activities. The project owner shall notify the CPM when all ground disturbing activities, including landscaping, are completed.

**CUL-10** Throughout the construction monitoring and mitigation phases of the project, the CRS and delegated monitor(s) shall keep a daily log of any resource finds and the progress or status of the resource monitoring, mitigation, preparation, identification, and analytical work being conducted for the project. The daily logs shall indicate by tenths of a post mile, where and when monitoring has taken place, where monitoring has been deemed unnecessary, and where cultural resources were found.

The CRS shall prepare a weekly summary of the daily logs on the progress or status of cultural resource-related activities.

The CRS and delegated monitor(s) may informally discuss the cultural resource monitoring and mitigation activities with Commission technical staff.

**Verification:** Throughout the project construction period, the project owner shall ensure that the daily log(s) and the weekly summary reports prepared by the CRS and delegated monitor(s) are available for periodic audit by the CPM.

**CUL-11** The project owner shall ensure that the CRS performs the recovery, preparation for analysis, analysis, preparation for curation, and delivery for curation of all cultural resource materials encountered and collected during pre-construction surveys and during the monitoring, data recovery, mapping, and mitigation activities related to the project.

**Verification:** The project owner shall maintain in its compliance files, copies of signed contracts or agreements with the museum(s), university (ies), or other appropriate research specialists. The project owner shall maintain these files for the life of the project and the files shall be kept available for periodic audit by the CPM. Information as to the specific location of sensitive cultural resource site shall be kept confidential and accessible only to qualified cultural resource specialists.

**CUL-12** Following completion of data recovery and site mitigation work, the project owner shall ensure that the CRS prepares a proposed scope of work for the Cultural Resources Report and for a document for the general public. The project owner shall submit the proposed scope of work to the CPM for review and approval.

**Protocol:** The proposed scope of work shall include (but not be limited to):

- a. a discussion of any analysis to be conducted on recovered cultural resource materials;
- b. discussion of possible results and findings;
- c. proposed research questions which may be answered or raised by analysis of the data recovered from the project;



- d. an estimate of the time needed to complete the analysis of recovered cultural resource materials and to prepare the Cultural Resources Report;
- e. evaluation of historic buildings;
- f. HAER recording of historical buildings; and
- g. a public oriented document for distribution to local museums, libraries and schools.

**Verification:** The project owner shall ensure that the CRS prepares the proposed scope of work within 90 days following completion of the data recovery and site mitigation work. Within 7 days after completion of the proposed scope of work, the project owner shall submit it to the CPM for review and approval.

**CUL-13** The project owner shall ensure that the CRS prepares a Cultural Resources Report (CRR) and a document for the general public. The project owner shall submit the CRR and public report to the CPM for review and approval.

**Protocol:** The Cultural Resources Report shall include (but not be limited to) the following:

a. For all projects:

- 1. evaluation of historic buildings;
- 2. HAER recording of historical buildings; and
- 3. a public oriented document for distribution to local libraries and schools.
- 4. description of pre-project literature search, surveys, and any testing activities;
- 5. maps showing areas surveyed or tested;
- 6. a description of any monitoring activities;
- 7. maps, including maps using a 7.5 minute USGS topographic base, of any areas monitored; and
- 8. conclusions and recommendations.

b. For projects in which cultural resources were encountered, include the items specified under “a” and also provide:

- 1. site and isolate records and maps;
- 2. a description of testing for, and determinations of, significance and potential eligibility; and
- 3. a discussion of the research questions answered or raised by the data from the project.

c. For projects regarding which cultural resources were recovered, include the items specified under “a” and “b” and also provide:

4. a description of the methods employed in the field and laboratory; a description (including drawings and/or photos) of recovered cultural materials;
5. results and findings of any special analyses conducted on recovered cultural resource materials;
6. an inventory list of recovered cultural resource materials; an interpretation of the site(s) with regard to the research design; and
7. the name and location of the public repository receiving the recovered cultural resources for curation.

**Verification:** The project owner shall ensure that the CRS completes the CRR and the public document within 90 days following completion of the analysis of the recovered cultural materials. Within 7 days after completion of the report, the project owner shall submit the CRR and the public document to the CPM for review and approval.

**CUL-14** The project owner shall submit an original, an original-quality copy, and a computer disc copy (or other format to meet the repository's requirements), of the CPM-approved CRR to the public repository to receive the recovered data and materials for curation, with copies to the State Historic Preservation Officer (SHPO), the appropriate regional archaeological information center(s). If the report is submitted to any of these entities on a computer disc, the disc files must meet SHPO requirements for format and content.

**Protocol:** The copies of the CRR to be sent to the entities specified above shall include the following (based on the applicable scenario (a, b, or c) set forth in condition Cul-12):

- a. originals or original-quality copies of all text;
- b. originals of any topographic maps showing site and resource locations;
- c. originals or original-quality copies of drawings of significant or diagnostic cultural resource materials found during pre-construction surveys or during project monitoring and mitigation and subjected to post-recovery analysis and evaluation.
- d. photographs of any cultural resource site(s) and the various cultural resource materials recovered during project monitoring and mitigation and subjected to post-recovery analysis and evaluation. The project owner shall provide the curation repository with a set of negatives for all of the photographs.

**Verification:** Within 30 days after receiving approval of the CRR, the project owner shall provide to the CPM documentation that the report has been sent to the public repository receiving the recovered data and materials for curation, the SHPO and the appropriate archaeological information center(s).

For the life of the project the project owner shall maintain in its compliance files copies of all documentation related to the filing of the CPM-approved CRR with the public repository receiving the recovered data and materials for curation.

**CUL-15** Following the filing of the CPM-approved CRR with the appropriate entities, specified in condition CUL-14, the project owner shall ensure that all cultural resource materials, maps, and data collected during data recovery and mitigation for the project are delivered to a public repository that meets the US Secretary of Interior requirements for the curation of cultural resources. The project owner shall pay any fees for curation required by the repository.

**Verification:** The project owner shall ensure that all recovered cultural resource materials are delivered for curation within 30 days after providing the CPM-approved CRR to the entities specified in CUL-14

For the life of the project the project, owner shall maintain in its of compliance files, copies of signed contracts or agreements with the public repository to which the project owner has delivered for curation all cultural resource materials collected during data recovery and mitigation for the project.

**CUL-16** The project owner shall submit an original or an original-quality copy of the CPM-approved public document to the local public libraries and public schools.

**Verification:** Within 30 days after receiving approval of the public document, the project owner shall provide to the CPM documentation that the report has been sent to the local public libraries and public schools.

**CUL-17** The project owner shall ensure that the Meter House and Compressor House buildings are moved to a nearby permanent location acceptable to the City and County of San Francisco where the buildings can be rehabilitated in a manner sufficient to provide for public displays of the role these buildings played in the history of San Francisco.

**Verification:**No later than 90 days after certification, the project owner shall provide proof to the CPM of contract(s) for the moving of the Meter House and Compressor House to the CCSF approved site, and shall provide proof to the CPM that the project owner has purchased or otherwise provided the land to which the buildings will be relocated.

**CUL-18** The project owner shall ensure that an interpretive kiosk that provides a public interpretation of the history of the project area is built adjacent to, or in close proximity to, the plant site. The kiosk design, a script and proposed graphics will be provided to the CPM for review and approval. The project owner shall ensure that the kiosk is properly maintained for the life of the project.

**Verification:** Within 90 days after receiving approval of the kiosk design, a script and proposed graphics, the project owner will provide a letter to the CPM describing

the contractor that will be constructing the interpretive kiosk and installing the displays. The letter will include the proposed completion date for the display.

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# HAZARDOUS MATERIALS MANAGEMENT

Testimony of Alvin J. Greenberg, Ph.D. and Rick Tyler

## INTRODUCTION

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The purpose of this Final Staff Assessment (FSA) is to determine if the proposed Potrero Power Plant Unit 7 Project (Unit 7) has the potential to cause significant impact on the public as a result of the use, handling or storage of hazardous materials at the proposed facility. If significant adverse impacts on the public are identified, Energy Commission staff must also evaluate the potential for facility design alternatives and additional mitigation measures to reduce impacts to the extent feasible.

This analysis does not address potential exposure of workers to hazardous materials used at the proposed facility. Employers must inform employees of hazards associated with their work and thus employees accept a higher level of risk than the general public as a condition of employment. Workers are thus not afforded the same level of protection normally provided to the public. Further, workers can be provided with special protective equipment and training to reduce the potential for health impacts associated with the handling of hazardous materials. Staff's **Worker Safety and Fire Protection** analysis also describes the requirements applicable to the protection of workers from such risks.

The only hazardous material stored at the Potrero Power Plant Unit 7 in quantities exceeding the reportable amounts defined in the California Health and Safety Code, section 25532 (j), is aqueous ammonia (29 percent ammonia in aqueous solution; see Tables 8.12-2, 8.12-3 and 8.12-4 of the Application for Certification [SECAL 2000a, AFC]). The use of aqueous ammonia significantly reduces the risk that would otherwise be associated with use of the more economical anhydrous form of ammonia. Use of the aqueous form eliminates the high internal energy associated with the more hazardous anhydrous form, which is stored as a liquefied gas at elevated pressure. The high internal energy associated with the anhydrous form of ammonia can act as a driving force in an accidental release, which can rapidly introduce large quantities of the material to the ambient air, where it can be transported in the atmosphere and result in high down-wind concentrations. Spills associated with the aqueous form are much easier to contain and emissions are limited by the slow mass transfer from the surface of the spilled material.

Other hazardous materials stored in smaller quantities, such as mineral and lubricating oils, corrosion inhibitors and water conditioners, will be present at the proposed facility. However, these materials pose no significant potential for off-site impacts as a result of the quantities on-site, their relative toxicity, and/or their environmental mobility. Although no natural gas is stored, the project will also involve the construction and operation of a natural gas pipeline and handling of large amounts of natural gas. Natural gas poses some risk of both fire and explosion; however, the gas line will not be lengthy and will be attached to an existing on-site main. Thus, off-site gas pipeline construction will not be required and the pipeline design is addressed in staff's **Facility Design** analysis.

Unit 7 will also require the transportation of aqueous ammonia to the facility. Analysis of the potential for impact associated with such deliveries is addressed below.

## **LAWS, ORDINANCES, REGULATIONS, STANDARDS AND POLICIES**

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The following federal, state, and local laws and policies apply to the protection of public health and hazardous materials management. Staff's analysis examines the project's compliance with these requirements.

### **FEDERAL**

The Superfund Amendments and Reauthorization Act of 1986 (Pub. L. 99-499, §301,100 Stat. 1614 [1986]), also known as SARA Title III, contains the Emergency Planning and Community Right To Know Act (EPCRA) as codified in 42 U.S.C. §11001 et seq. This Act requires that certain information about any release to the air, soil, or water of an extremely hazardous material must be reported to state and local agencies.

The Clean Air Act (CAA) of 1990 (42 U.S.C. §7401 et seq. as amended) established a nationwide emergency planning and response program and imposed reporting requirements for businesses which store, handle, or produce significant quantities of extremely hazardous materials. The CAA section on Risk Management Plans - codified in 42 U.S.C. §112(r) - requires the states to implement a comprehensive system to inform local agencies and the public when a significant quantity of such materials is stored or handled at a facility. The requirements of the CAA are reflected in the California Health and Safety Code, section 25531 et seq.

Currently, due to the high volume of petroleum-containing hazardous materials already in place on this site, the applicant is required to have a Spill Prevention Control and Countermeasure Plan (SPCC) in place (Hazardous Waste Contingency Plan Title 40 C.F.R., Part 112.7).

### **STATE**

The California Accidental Release Prevention Program (Cal-ARP) - Health and Safety Code, section 25531 - directs facility owners storing or handling acutely hazardous materials in reportable quantities, to develop a Risk Management Plan (RMP) and submit it to appropriate local authorities, the United States Environmental Protection Agency (USEPA), and the designated local Administering Agency for review and approval. The plan must include an evaluation of the potential impacts associated with an accidental release, the likelihood of an accidental release occurring, the magnitude of potential human exposure, any preexisting evaluations or studies of the material, the likelihood of the substance being handled in the manner indicated, and the accident history of the material. This new, recently developed program supersedes the California Risk Management and Prevention Plan (RMPP).

Section 25503.5 of the California Health and Safety Code requires facilities which store or use hazardous materials to prepare and file a Business Plan with the local Certified Unified Program Authority (CUPA), in this case the San Francisco County Public Health Department. This Business Plan is required to contain information on the business activity, the owner, a hazardous materials inventory, facility maps, an Emergency

Response Contingency Plan, an Employee Training Plan, and other recordkeeping forms.

Title 8, California Code of Regulations, section 5189, requires facility owners to develop and implement effective safety management plans to insure that large quantities of hazardous materials are handled safely. While such requirements primarily provide for the protection of workers, they also indirectly improve public safety and are coordinated with the RMP process.

Title 8, California Code of Regulations, section 458 and sections 500 – 515, set forth requirements for design, construction and operation of vessels and equipment used to store and transfer anhydrous ammonia. These sections generally codify the requirements of several industry codes, including the ASME Pressure Vessel Code, ANSI K61.1 and the National Boiler and Pressure Vessel Inspection Code. While these codes apply to anhydrous ammonia, they may also be used to design storage facilities for aqueous ammonia.

California Health and Safety Code, section 41700, requires that “No person shall discharge from any source whatsoever such quantities of air contaminants or other material which causes injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public, or which endanger the comfort, repose, health, or safety of any such persons or the public, or which cause, or have a natural tendency to cause injury or damage to business or property.”

## **Gas Pipeline**

The safety requirements for pipeline construction vary according to the population density and land use, which characterize the surrounding land. The pipeline classes are defined as follows (Title 49, Code of Federal Regulations, Part 192):

- Class 1: Pipelines in locations with ten or fewer buildings intended for human occupancy.
- Class 2: Pipelines in locations with more than ten but fewer than 46 buildings intended for human occupancy. This class also includes drainage ditches of public roads and railroad crossings.
- Class 3: Pipelines in locations with more than 46 buildings intended for human occupancy, or where the pipeline is within 100 yards of any building or small well-defined outside area occupied by 20 or more people on at least 5 days a week for 10 weeks in any 12 month period (The days and weeks need not be consecutive).

The natural gas pipeline will be designed for Class 3 service and will meet California Public Utilities Commission General Order 112-D and 58-A standards as well as various PG&E standards. The natural gas pipeline must be constructed and operated in accordance with the Federal Department of Transportation (DOT) regulations, Title 49, Code of Federal Regulations (CFR), Parts 190, 191, and 192:

- Title 49, Code of Federal Regulations, Part 190 outlines the pipeline safety program procedures;



- Title 49, Code of Federal Regulations, Part 191, Transportation of Natural and Other Gas by Pipeline; Annual Reports, Incident Reports, and Safety-Related Condition Reports, requires operators of pipeline systems to notify the U.S. Department of Transportation of any reportable incident by telephone and then submit a written report within 30 days;
- Title 49, Code of Federal Regulations, Part 192, Transportation of Natural and Other Gas by Pipeline: Minimum Federal Safety Standards, specifies minimum safety requirements for pipelines and includes material selection, design requirements, and corrosion protection. The safety requirements for pipeline construction vary according to the population density and land use, which characterize the surrounding land. This part contains regulations governing pipeline construction, which must be, followed for Class 2 and Class 3 pipelines.

## **LOCAL AND REGIONAL**

The Uniform Fire Code (UFC 1997) contains provisions regarding the storage and handling of hazardous materials in Articles 79 and 80. The most recent version of the UFC was in 1997. The City and County San Francisco (CCSF) adopted this version of the UFC into the municipal code in 1999. Section 8005.1 of Article 80 gives authority to the Chief of the San Francisco Fire Department to designate hazardous materials transportation routes.

The California Building Code contains requirements regarding the storage and handling of hazardous materials. The Chief Building Official must inspect and verify compliance with these requirements prior to issuance of an occupancy permit. A further discussion of these requirements is provided in the **Facility Design** portion of this document.

The San Francisco Health Code Article 21, Division II, section 1110 requires a current hazardous materials registration certificate be obtained for any facility, which stores or uses hazardous materials in certain amounts. Section 1110.1 requires that a Hazardous Materials Plan be prepared consistent with the provisions of Section 25509 of the California Health and Safety Code and the federal EPCRA (SARA Title III, see above). Article 21a, section 1180 designates the Public Health Department as the CUPA for review and evaluation of RMPs prepared pursuant to the Cal-ARP Act.

Both a Safety Plan and a Risk Management Plan (RMP) to be prepared and submitted to the County Planning Department. In regards to seismic safety issues, the site is located in Seismic Risk Zone 4. Construction and design of buildings and vessels storing hazardous materials must conform to the 1997 Uniform Building Code, the 1998 California Building Code, and the San Francisco County Building Code.

## **SETTING**

The proposed project is located the southeast area of the City and County of San Francisco. The site is located within the existing Potrero Power Plant and borders industrial areas lie to the north, south, and west. To the east and south is San Francisco Bay. Mixed land uses lie to the west and include commercial areas and a residential neighborhood. Hazardous materials use and transportation are associated with many of the commercial and industrial activities in the area. Thus, hazardous

materials are commonly transported, stored, and used in the project vicinity. Access to the site is via Illinois and 23<sup>rd</sup> streets.

Several factors associated with the area in which a project is to be located affect its potential to cause public health impacts from an accidental release of a hazardous material. These include:

- local meteorology;
- terrain characteristics; and
- location of population centers and sensitive receptors relative to the project.

## **METEOROLOGICAL CONDITIONS**

Meteorological conditions, including wind speed, wind direction and air temperature, affect the extent to which accidentally released hazardous materials would be dispersed into the air and the direction in which they would be transported. This affects the level of public exposure to such materials and the associated health risks. When wind speeds are low and stable, dispersion is severely reduced and can lead to increased localized public exposure.

Recorded wind speeds and ambient air temperatures are described in the air quality section of the AFC (§8.1). This data indicates that wind speeds below one meter per second and temperatures exceeding 80°F occur in the project area, albeit rarely owing to the temperate nature of the San Francisco Bay microclimate. Therefore, staff agrees with the applicant that use of F stability (stagnated air, very little mixing), one meter/second wind speed, and an ambient temperature of 106° F in its modeling analysis of an accidental release is an extremely conservative scenario and thus reflects worst case atmospheric conditions. Staff also believes that the Applicant's Alternative Scenario modeling input parameters (see Table 8.12-5 of the AFC) presents a more reasonable scenario of the dispersion of an accidental release.

## **TERRAIN CHARACTERISTICS**

The location of elevated terrain (terrain above the power plant stack height) is often an important factor to be considered in assessing potential exposure. An emission plume resulting from an accidental release may impact high elevations before impacting lower elevations. Modeling of an accidental release of aqueous ammonia at the proposed facility indicates that significant concentrations would be confined to the facility property and that off-site concentrations – even at elevated locations – would be so low as to pose no hazard to the public. The project site and immediate vicinity (within 2000 feet) is mostly level terrain. The nearest elevated locations (the slopes of Potrero Hill) are located approximately 2000 feet from the facility to the west. However, because modeling results show impacts are insignificant at the fence line, elevated terrain is not an important factor affecting the modeled results of accidental releases of aqueous ammonia at this site.

## **LOCATION OF EXPOSED POPULATIONS AND SENSITIVE RECEPTORS**

The general population includes many sensitive subgroups that may be at greater risk from exposure to emitted pollutants. These sensitive subgroups include the very young, the elderly, and those with existing illnesses. In addition, the location of the population in the area surrounding a project site may have a large bearing on health risk. Table 8.12-1 and Map 8.6-1 (SECAL 2000a) lists and shows the locations of both populated areas and sensitive receptors in the project vicinity. The fenceline closest to the aqueous ammonia storage tank area is 250 feet to the south of the tanks. The nearest public receptor is the Warm Water Cove Public Access Area approximately 300 feet south of the facility fenceline.

The nearest commercial and residential receptors are both located approximately 1900 feet NW of the aqueous ammonia storage tanks. The nearest industry and office buildings are around 1400 feet and 1800 feet (respectively) to the west of the aqueous ammonia storage tanks. The nearest school is located 1/2 miles to the west, the nearest day care center 3/4 mile distant, and the nearest hospital is approximately one mile away.

## **ENVIRONMENTAL IMPACTS**

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Staff thoroughly reviewed and assessed the potential for the transportation, handling, and use of hazardous materials to impact the surrounding community. All chemicals and natural gas were evaluated.

## **METHODOLOGY**

In order to assess the potential for released hazardous materials to travel off-site, and impact on the public, staff analyzed several aspects of the proposed use of these materials at the facility. Staff recognizes that some chemicals must be used that are toxic. Therefore, staff conducted its analysis by examining the need for hazardous materials, the choice of chemical to be used and its amount, the manner in which the applicant will use the chemical, the manner it will be transported to the facility and transferred to facility storage tanks, and the way the applicant chooses to store the material on-site. Staff reviewed the applicant's proposed engineering controls and administrative controls concerning hazardous materials usage. Engineering controls are those physical or mechanical systems (such as storage tanks or automatic shut-off valves) which can prevent a spill of hazardous material from occurring or which can limit the spill to a small amount or confine it to a small area. Administrative controls are those rules and procedures that workers at the facility must follow that will help to prevent accidents or keep them small if they do occur. Both engineering and administrative controls can act as methods of prevention or as methods of response and minimization. In both cases, the goal is to prevent a spill from moving off-site and causing harm to people.

Staff conducted a thorough review and evaluation of the applicant's proposed use of hazardous materials as described by the applicant in the AFC (Section 8.12) and in data responses. Staff's assessment followed the five steps listed below:

- Step 1: Staff reviewed the chemicals and the amounts currently on-site or proposed for use as listed in Tables 8.12-2, 8.12-3, and 8.12-4 of the AFC and determined the need and appropriateness of their use. If less toxic materials are available, staff suggested their use instead. [Table 8.12-2 lists those materials currently on-site, Table 8.12-3 lists petroleum-containing hazardous materials such as diesel fuel, and Table 8.12-4 lists the additional hazardous materials proposed for use on the site.]
- Step 2: Those chemicals, proposed for use in small amounts or whose physical state is such that there is virtually no chance that a spill would migrate off the site and impact the public, were removed from further assessment.
- Step 3: Measures proposed by the applicant to prevent spills were reviewed and evaluated. These included engineering controls such as automatic shut-off valves and different size transfer-hose couplings and administrative controls such as worker training and safety management programs.
- Step 4: Measures proposed by the applicant to respond to accidents were reviewed and evaluated. These measures also included engineering controls such as catchment basins and methods to keep vapors from spreading and administrative controls such as training emergency response crews.
- Step 5: Staff then analyzed the theoretical impacts on the public worst-case spill of hazardous materials even with the mitigation measures proposed by the Applicant. If the mitigation methods proposed by the applicant were found to be sufficient, no further mitigation would be required. If the proposed mitigation proposed by the Applicant were found to be insufficient to reduce the potential for adverse impacts to an insignificant level, staff would then propose additional prevention and response controls until the potential for causing harm to the public was reduced to an insignificant level. It is only at this point that staff can recommend that the facility be allowed to use hazardous materials.

## **PROJECT IMPACTS**

As proposed, the facility will cause no significant risk of off-site impacts. Thus, the direct impacts of the project will not add to any existing accidental release risks.

### **Small Quantity Hazardous Materials**

In conducting the analysis, staff determined in Steps 1 and 2 that some materials, although present at the proposed facility, pose a minimal potential for off-site impacts as they will be stored in a solid form or in smaller quantities or have very low toxicity. These hazardous materials were thus removed from further assessment. For example, one such group of chemicals is the scale inhibitors chosen for use at the site. Scale inhibitors are used to control and reduce the potential for scale and corrosion to form within the pipeline system. This group of chemicals includes the NALCO series of solutions, trisodium phosphate, nitrite or molybdate inhibitors, and sodium bisulfite. These chemicals are safer to use than others often used at other facilities for this purpose, such as hydrazine, and the applicant has thus chosen the most appropriate substitute. Staff has determined that the potential for impacts on the public are insignificant if the applicant uses those scale inhibitors and corrosion controllers that contain only the active ingredients on the list. See Appendix C for a list of chemicals that will be used at the power plant.

During the construction phase of the project, the only hazardous materials proposed for use include phosphate or nitrate cleaning solutions, cleaning solvents, antifreeze, and pesticides. Any impact of spills or other releases of these materials will be limited to the site due to the small quantities involved and thus no further analysis of construction phase activities appears warranted.

The existing use of a small quantity of hydrogen gas (237 lbs.) poses a risk of explosion. However, the small quantity present and the results of previous modeling of the blast effects of a hydrogen tank explosion (for a similar facility in California) demonstrate that any blast effect will be confined to the site and not impact off-site. The Applicant indicates that the hydrogen cylinders will be stored in an area isolated from potential ignition sources.

After removing from consideration those chemicals that fit into Steps 1 and 2, staff continued with Steps 4 and 5 to review the only remaining hazardous materials: sulfuric acid, sodium hypochlorite, petroleum fuels, natural gas, and aqueous ammonia.

### **Large Quantity Hazardous materials**

According to the applicant (SECAL, 2000a), more than 5000 lb. of 29 percent Sulfuric acid will be used and stored on-site. This material does not pose a risk of off-site impacts because it has an extremely low vapor pressure and thus a spill would be confined to the site. Because of public concern at another proposed energy facility in 1995, staff conducted a quantitative assessment of the potential for impact associated with the use, storage, and transport of 93% sulfuric acid. Staff found no hazard would be posed to the public using this more concentrated form.

The aqueous mixture of sodium hypochlorite (30,000 gallons) will likewise have a low potential to affect the off-site public because its vapor pressure is also low and the concentration of hypochlorite is low (12.5 percent). In fact, hypochlorite is used at many such facilities as a substitute for chlorine gas, which is much more toxic and much more likely to migrate off-site because it is a gas and is stored in concentrated form. Thus, the use of a water solution of sodium hypochlorite is much safer to use than the alternative chlorine gas. However, accidental mixing of sodium hypochlorite with acids or aqueous ammonia could result in toxic gases. Given the large volumes of both aqueous ammonia (40,000 gals) and sodium hypochlorite (30,000 gals) proposed for storage at this facility, the chances for accidental mixing of the two - particularly during transfer from delivery vehicles to storage tanks - should be reduced as much as possible. Thus, measures to prevent such mixing are extremely important and will be required as an additional section within the required Safety Management Plan for delivery of aqueous ammonia (see Condition of Certification HAZ-3).

Large quantities (>20M gals) of petroleum-containing hazardous materials are presently used on this site. Fuels such as fuel oil #6, mineral oil, lube oil, and diesel fuel are all of very low volatility and impacts of spills are expected to remain on-site. A Spill Prevention Control and Countermeasure Plan (SPCC) is required by Federal Regulations (see LORS above) and has already been prepared for these petroleum-containing hazardous materials (see AFC section 8.12.1.2).

## **Natural Gas**

Natural gas poses a fire and/or explosion risk as a result of its flammability. Natural gas is composed of mostly methane but also contains ethane, propane, nitrogen, butane, isobutane and isopentane. It is colorless, odorless, and tasteless and is lighter than air. Natural gas can cause asphyxiation when methane is ninety percent in concentration. Methane is flammable when mixed in air at concentrations of 5 to 14 percent, which is also the detonation range. Natural gas, therefore, poses a risk of fire and/or explosions if a release were to occur. However, it should be noted that, due to its tendency to disperse rapidly (Lees 1983), natural gas is less likely to cause explosions than many other fuel gases, such as propane or liquefied petroleum gas. While natural gas will be used in significant quantities, it will not be stored on-site.

The risk of a fire and/or explosion on-site can be reduced to insignificant levels through adherence to applicable codes and development and implementation of effective safety management practices. In particular, gas explosions can occur in the Heat Recovery Steam Generator (HRSG) and during start-up. The National Fire Protection Association (NFPA 85A) requires 1) the use of double block and bleed valves for gas shut-off; 2) automated combustion controls; and 3) burner management systems. These measures will significantly reduce the likelihood of an explosion in gas-fired equipment.

Additionally, start-up procedures will require air purging of the gas turbines prior to start-up, thus precluding the presence of an explosive mixture. The safety management plan proposed by the applicant will address the handling and use of natural gas and significantly reduce the potential for equipment failure due to improper maintenance or human error. Since the proposed facility will not require the installation of any new gas pipelines off-site, impacts from a break in the pipeline are limited to the existing pipelines already in use in the area or in the new pipeline to be installed on-site. The design of the natural gas pipeline is governed by laws and regulations discussed in staff's **Facility Design** analysis. Thus, the only new gas pipelines installed for the proposed project will be placed on-site where the risk of natural gas accidents can be better controlled and minimized. Therefore, the use of natural gas at the proposed facility will not result in adverse off-site impacts.

## **Aqueous Ammonia**

Aqueous ammonia will be used in controlling the emission of oxides of nitrogen ( $\text{NO}_x$ ) from the combustion of natural gas in the facility. The accidental release of aqueous ammonia without proper mitigation can result in hazardous down-wind concentrations of ammonia gas. Two 20,000-gallon tanks will be used to store the 29.4 percent aqueous ammonia.

Based on the screening analysis discussed above, aqueous ammonia is the only hazardous material that may pose a risk of off-site impacts. The use of aqueous ammonia can result in the formation and release of toxic gases in the event of a spill even without interaction with other chemicals. This is a result of its relatively high vapor pressure and the large amounts of aqueous ammonia, which will be used and stored on-site. However, as with aqueous hypochlorite, the use of aqueous ammonia instead of the much more hazardous anhydrous ammonia (i.e. ammonia that is not diluted with water) poses far less risk. .

To assess the potential impacts associated with an accidental release of ammonia, staff typically evaluates where four “bench mark” exposure levels of ammonia gas occur off-site. These include: 1) the lowest concentration posing a risk of lethality, 2,000 ppm; 2) the Immediately Dangerous to Life and Health (IDLH) level of 300 ppm; 3) the Emergency Response Planning Guideline (ERPG) level 2 of 150 ppm (recently changed from the 200 ppm value), which is also the RMP level 1 criterion used by USEPA and California; and 4) the level considered by the Energy Commission staff to be without serious adverse effects on the public for a one-time exposure of 75 ppm. (A detailed discussion of the exposure criteria considered by staff and their applicability to different populations and exposure-specific conditions is provided in Appendix A of this analysis.) If the potential exposure associated with a potential release exceeds 75 ppm at any public receptor, staff will presume that the potential release poses a risk of significant impact. However, staff will also assess the probability of occurrence of the release and/or the nature of the potentially exposed population. Staff may, based on such analysis, determine that the likelihood and extent of potential exposure are not sufficient to support a finding of potentially significant impact.

The AFC (section 8-12.2.2.3) provided the results of modeling for a worst case and alternative case accidental release of aqueous ammonia. The worst-case release scenario postulated a spontaneous catastrophic failure of the entire 20,000-gallon contents of one of the two storage tanks. In conducting this analysis, it was assumed that spilled material would be contained in the covered basin below the storage vessel and tanker truck pad and that winds of 1.0 meters per second and atmospheric stability category F would exist at the time of the accidental release. An air temperature of 106° F was assumed. The USEPA SCREEN3 air dispersion model was used to estimate airborne concentrations of ammonia. These analyses were designed to predict the maximum possible impacts based on distance from the storage tank without regard to specific direction of transport.

The alternative analysis consists of the accidental release of 8,000 gallons of aqueous ammonia from the delivery tanker truck during transfer to the storage tanks. The spilled ammonia would flow to the same covered collection sump as in the worst-case scenarios but more realistic meteorological conditions were used as inputs to the SCREEN 3-air dispersion model. Atmospheric Stability Class D (instead of the more conservative F) was used, a lower ambient temperature was assumed (57.1° F vs. 106° F), and a wind speed of 3 m/s was assumed instead of 1 m/s.

The results indicated that concentrations exceeding 75 PPM would be confined to the project site (less than 164 feet from the storage tanks for the worst-case and 95 feet for the alternative scenario). Airborne ammonia concentrations were also estimated at the nearest fenceline (~3.75 ppm worst-case and ~1.1 ppm alternative scenario). In response to data requests (SAEJ2000DReq1, Data Request No.118), the applicant (Mirant2001DResSAEJ, Data Response No.118) indicated that airborne concentrations under the worst-case scenario would be 34 ppm at the southern fenceline (which is the nearest fenceline to the storage tanks) and 8 ppm at the park located 300 feet to the south.

Because of these discrepancies in reporting the results of the off-site consequence modeling, staff conducted its own modeling using the SCREEN3 air dispersion model.

The results of this analysis confirm that the 75-ppm criteria would be reached at 162 feet from the storage tanks as stated in the AFC. Staff was also able to confirm the levels stated in the data response to SAEJ that the airborne concentration at the nearest fenceline (250 feet from the tanks) would be 32 ppm and that the concentration at the park located 500 feet from the tanks to the south would be 8.7 ppm. Staff estimated airborne concentrations at other receptors as: 0.8 ppm at the nearest commercial and residential receptors (~1900 feet NW of the storage tanks), 1.3 ppm at the nearest industry (~1400 feet from the tanks), 0.46 ppm at the nearest school (~1/2 mile from the tanks), 0.24 ppm at the nearest day care center (~3/4 mile distant), and 0.16 ppm at the nearest hospital (~1 mile away). This analysis confirms the applicant's contention that a catastrophic failure of an aqueous ammonia storage tank would not result in adverse impacts to off-site receptors. Referring to Appendix B of this staff assessment, it is doubtful that most people would even notice an odor during such an event.

### **Seismic Issues**

Concern exists over the possibility that an earthquake would cause the failure of a hazardous materials storage tank. The quake could also cause the failure of the secondary containment system (berms and dikes) as well as electrically controlled valves, pumps, neutralization systems and the foam vapor suppression system. The failure of all these preventive control measures might then result in a vapor cloud of hazardous materials moving off-site and impacting the residents and workers in the surrounding community. This concern over earthquake safety is heightened by the Loma Prieta earthquake of 1989, the Northridge earthquake of 1994, and the earthquake in Kobe, Japan in January 1995.

Information obtained after the January 1994 Northridge earthquake showed that some damage was caused to several large storage tanks and smaller tanks associated with the water treatment system of a cogeneration facility. Those tanks with the greatest damage - including seam leakage - were older tanks while the newer tanks sustained displacements and failures of attached lines. Therefore, staff conducted an analysis of the codes and standards, which should be followed in adequately designing and building storage tanks and containment areas to withstand a large earthquake. Referring to the sections on **GEOLOGIC HAZARDS** and **FACILITY DESIGN** in the AFC, staff notes that the proposed facility will be designed and constructed to the applicable standards of the Uniform Building Code for Seismic Zone 4.

### **Transportation of Hazardous Materials**

The transportation of hazardous materials to the facility is of great concern to the residents and workers in the surrounding community. Concern over the potential for an accident involving a delivery vehicle and a resultant chemical spill has been expressed. Hazardous materials including aqueous ammonia, sulfuric acid, and sodium hypochlorite will be transported to the facility via tanker truck. While many types of hazardous materials will be transported to the site it is staff's belief that transport of aqueous ammonia poses the predominance of risk associated with such transport.

Aqueous ammonia would be delivered to the facility by tanker truck and thus it is possible that ammonia can be released during a transportation accident. The extent of impact in the event of such a release would depend on the location and on the rate of



dispersion of ammonia vapor from the surface of the aqueous ammonia pool. The likelihood of an accidental release during transport is dependent on three factors:

1. the skill of the tanker truck driver,
2. the type of vehicle used for transport, and on
3. accident rates.

To address this concern, staff evaluated the risk of an accidental transportation release in the project area. Staff's analysis focused on the project area after the delivery vehicle leaves the main highway. Staff believes that it is appropriate to rely on the extensive regulatory program that applies to shipment of hazardous materials on California Highways to ensure safe handling in general transportation (see The Federal Hazardous Materials Transportation Law 49 USC §5101 et seq, The US Department of Transportation Regulations 49 CFR Subpart H, §172-700, and California DMV Regulations on Hazardous Cargo). These regulations also address the issue of driver competence. (See AFC section 8.10 for additional information on regulations governing the transportation of hazardous materials.)

To address the issue of tank truck safety, aqueous ammonia will be delivered to the proposed facility in Department of Transportation (DOT) certified vehicles with design capacity of 8000 gallons. These vehicles will be designed to DOT Code MC-307. These are high integrity vehicles designed for hauling of caustic materials such as ammonia. Staff has therefore proposed a Condition of Certification (HAZ-5) to ensure that regardless of which vendor supplies the aqueous ammonia, delivery will be made in a tanker, which meets or exceeds the specifications described by these regulations.

To address the issue of accident rates, staff reviewed the technical and scientific literature on hazardous materials transportation (including tanker trucks) accident rates in the United States and California. Staff relied on the following references to determine the approach to preparing a hazardous materials transportation accident risk analysis:

Rhyne, W.R. 1994. Hazardous Materials Transportation Risk Analysis. Quantitative Approaches for Truck and Train.

Chapter 2: Transportation Quantitative Risk Analysis

Chapter 3: Databases

Davies, P.A. and Lees, F.P. 1992. "The Assessment of Major Hazards: The Road Transport Environment for Conveyance of Hazardous Materials in Great Britain." Journal of Hazardous Materials, 32: 41-79.

Harwood, D.W., Viner, J.G., and E.R. Russell. 1990. "Truck Accident Rate Model for Hazardous Materials Routing." Transportation Research Record. 1264: 12-23.

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Vilchez, J.A., Sevilla, S., Montiel, H. and J. Casal. 1995. "Historical Analysis of Accidents in Chemical Plants and in the Transportation of Hazardous Materials." J. Loss Prev. Process Ind. 8(2): 87-96

Pet-Armacost, J.J., Sepulveda, J. and M. Sakude. 1999. "Monte Carlo Sensitivity Analysis of Unknown Parameters in Hazardous Materials Transportation Risk Assessment." Risk Analysis. 19(6): 1173-1184.

National Response Center  
Chemical Incident Reports Center, U.S. Chemical Safety Board  
National Transportation Safety Board

Staff used data from the Davies and Lee (1992) article which references the 1990 Harwood study to determine that the frequency of release for transportation of hazardous materials in the U.S. is between 0.06 and 0.19 releases per million miles traveled on well designed roads and highways. The same source provides estimates of the probability that such an event will occur at random in a location where a large number of people would be present and exposed within a large urban environment. It is estimated that about 8.9 percent of such incidents would result in more than 10 fatalities and that less than 1.4 percent would involve more than 33 fatalities. Thus the maximum risk of an accident causing more than 10 fatalities is about 0.017 ( $0.19 \times 0.089$ ) in one million per tanker mile traveled. The maximum risk of such an accident causing 33 or more fatalities is less than 0.0027 ( $0.19 \times 0.014$ ) in one million per tanker mile traveled. This does not include any mitigating affect resulting from meteorological conditions existing at the time of the event that frequently result in rapid dispersion of released materials mitigating potential impacts.

Assuming maximum usage of aqueous ammonia each year of operation of the proposed Potrero Power Plant facility, it will require about 73 tanker truck deliveries of aqueous ammonia per year (one truck every 5 days). Each truck delivery will travel about 2 miles between Interstate 280 and the facility per year (a specific transportation route will be required by Condition of Certification Haz-6). The result is ~146 miles of delivery truck travel in the project area per year. Thus, the maximum risk of accidental release and potential fatality of more than 10 people in the project area is less than 2.5 in one million per year and the risk of fatality of more than 33 people is less than 0.4 in one million.

Staff uses a significance threshold of 1 in 100,000 for risk of 10 fatalities and a threshold of 1 in 1,000,000 for risk of 100 fatalities. Both upper-bound risk estimates (0.25 and 0.4 in one million) are less than these thresholds. And in fact, data from the U.S. DOT show that the actual risk of a fatality over the past five years from all modes of hazardous material transportation (rail, air, boat, and truck) was approximately 0.1 in one million.

Staff therefore believes the risk of exposure to significant concentrations of aqueous ammonia during transportation to the facility are insignificant because of the remote possibility of accidental release of a sufficient quantity to present a danger to the public. The transportation of similar volumes of hazardous materials on the nation's highways is not unique nor an infrequent occurrence. Staff's analysis of the transportation of aqueous ammonia to the proposed facility (along with data from the U.S. DOT) demonstrates that the risk of accident and exposure is far less than those associated with many activities that the public readily accepts.

Based on the environmental mobility, toxicity, quantities present at the site and frequency of delivery, it is staff's opinion that aqueous ammonia poses the predominate risk associated with hazardous materials transportation and use at the proposed facility. Based on this, staff concludes that the risk associated with transportation of other hazardous materials to the proposed facility does not significantly increase the risk of impact beyond that associated with ammonia transportation.

Staff also finds that restricting the route of transportation would be important in keeping the risks of accidents to negligible levels. Accordingly, staff proposes a Condition of Certification (HAZ-6) that requires the applicant to use the approved hazardous materials transportation route (Interstate-280 to Cesar Chavez Street to Third St. to 23rd St. to the plant ).

## **CUMULATIVE IMPACTS**

Staff reviewed the potential for the operation of Unit 7 combined with existing industrial facilities to result in cumulative impacts on the population within the area. Projects that could potentially contribute to cumulative impacts are those located in the same geographic area of influence defined as within a 1-mile radius of the proposed power plant. Because there already exists a power generation facility on this site, the risks and hazards surrounding the transportation and use of hazardous materials has already been addressed for the existing facility and for the surrounding industries. Staff finds that the addition of the proposed Unit 7 to this site would not add significant cumulative impacts to those already encountered and addressed. Staff finds that the facility, as proposed by the Applicant and with the additional mitigation measures proposed by the Staff, poses a minimal risk of accidental release during transport, storage, and use, which could result in off-site impacts. Therefore, the direct impacts of the project will not add to any existing risk of accidental release.

Staff reviewed the demographic information provided in the **Socioeconomics** section of this PSA in relation to the location(s) around the proposed power plant that have the potential to receive a significant hazardous materials impact. Based on information collected during the course of this analysis from community members and from governmental sources, staff has determined that, with the implementation of mitigation proposed under staff's Proposed Conditions of Certification, there will not be an unmitigated disproportionate impact on a minority or low-income population.

## **ENVIRONMENTAL JUSTICE**

Staff has reviewed Census 2000 information that shows the minority population is greater than fifty percent within a six-mile radius of the proposed Potrero Power Plant Unit 7 Project (please refer to **Socioeconomics** Figure 1 in this Staff Analysis), and Census 1990 information that shows the low-income population is less than fifty percent within the same radius. Based on the **hazardous materials** analysis, staff has not identified significant direct or cumulative impacts resulting from the construction or operation of the project, and therefore there are no environmental justice issues related to this subject area that results from this project.

## **APPLICANT'S PROPOSED MITIGATION**

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The potential for accidents resulting in the release of hazardous materials is greatly reduced by the implementation of a safety management program, which includes the use of both engineering and administrative controls. Administrative controls include the development and implementation of a Safety Management Plan. Elements of facility controls and the safety management plan are summarized below.

### **ENGINEERING CONTROLS**

Engineering controls help to prevent accidents and releases (spills) from moving off-site and impacting the community by incorporating engineering safety design criteria into the design of the facility. The engineered safety features proposed by the applicant for use at this facility include:

- construction of curbs, berms, and/or catchment basins in the hazardous materials storage areas to contain accidental releases that might happen during storage or delivery;
- physical separation of stored chemicals in separate containment areas in order to prevent accidental mixing of incompatible materials which may result in the evolution and release of toxic gases or fumes;
- a 2,024 square foot containment area which will surround the two 20,000 gallon aqueous ammonia storage tanks and which will drain into a sump large enough to hold 37,163 gallons;
- a sloped containment pad for the aqueous ammonia tanker truck delivery area that will drain into the same subsurface covered sump placed beneath the storage tanks; and
- process protective systems including automatic shut-off valves, double-wall piping, and fire protection systems.

### **ADMINISTRATIVE CONTROLS**

Administrative controls also help to prevent accidents and releases (spills) from moving off-site and impacting the community by establishing worker training programs and process safety management programs and by complying with all applicable health and safety laws, ordinances and standards.

The worker health and safety program proposed by the Applicant for use at this facility will include (but is not limited to) the following elements:

- worker training regarding chemical hazards, health and safety issues, and hazard communication;
- the proper use of personal protective equipment;
- safety operating procedures for operation and maintenance of systems utilizing hazardous materials;
- fire safety and prevention; and emergency response actions including facility evacuation, hazardous material spill cleanup, and fire prevention.

At the facility, the project owner will designate an individual who has the responsibility and authority to ensure a safe and healthful workplace. The project health and safety professional oversees the health and safety program and has the authority to halt any action or modify any work practice in order to protect the workers, facility, and the surrounding community or in the event that the health and safety program is violated.

The facility Process Safety Management Program includes a program for the regular inspection and maintenance of equipment, valves, piping, and appurtenances. Additionally, the process safety management program requires that only trained facility personnel are assigned to the transfer and handling of hazardous chemicals.

The facility will also prepare a Hazardous Materials Business Plan and a Risk Management Plan (RMP).

## **ON-SITE SPILL RESPONSE**

In order to address the issue of spill response, the facility will prepare and implement an Emergency Response Plan which includes information on: hazardous materials contingency and emergency response procedures, spill containment and prevention systems, personnel training, spill notification, on-site spill containment, prevention equipment and capabilities, etc. Emergency procedures will be established which include evacuation; spill cleanup, hazard prevention, and emergency response.

## **STAFF MITIGATION**

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The worst-case accidental release scenario evaluated by the applicant in the AFC assumed that accidental spills would occur from the storage vessel into the basin below the storage vessel or from a tanker truck into the same catchment system. Staff believes that the most likely event resulting in a spill would be during transfer from the delivery tanker to the storage tank. Staff therefore proposes a condition (HAZ-3) requiring development of a safety management plan for the delivery of aqueous ammonia. The development of a Safety Management Plan addressing delivery of ammonia will further reduce the risk of any accidental release not addressed by the proposed spill prevention mitigation measures and the required Risk Management Plan (RMP). Staff also proposes that the applicant require all vendors transporting any hazardous material to the facility to use only the CEC CPM-approved route to the facility (Interstate-280 to Ceasar Chavez Street to Third St. to 23rd St. to the plant).

Staff has thoroughly evaluated the applicant's proposed handling, storage, and transfer methods for aqueous ammonia and the applicant's off-site consequence analysis. Staff is confident that when implemented, the applicant's safety program will keep accidental releases to a minimum and keep those, which do occur from impacting the off-site public. An evacuation plan will be prepared by the Applicant as part of the safety plans it must develop. Therefore, no further mitigation is warranted.

## **FACILITY CLOSURE**

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The requirements for handling of hazardous materials remain in effect until such materials are removed from the site regardless of facility closure. Therefore, the facility

owners are responsible for continuing to handle such materials in a safe manner, as required by applicable laws. In the event that the facility owner abandons the facility in a manner, which poses a risk to surrounding populations, staff will coordinate with the California Office of Emergency Services, San Francisco County Environmental Health Department, and the California Department of Toxic Substances Control (DTSC) to ensure that any unacceptable risk to the public is eliminated. Funding for such emergency action can be provided by federal, state or local agencies until the cost can be recovered from the responsible parties (O.E.S. 1990).

## **RESPONSE TO PUBLIC AND AGENCY COMMENTS ON THE PSA**

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### **THE CITY AND COUNTY OF SAN FRANCISCO (CCSF)**

**CCSF-6A:** *The proposed project will be the largest hazardous materials storage site in San Francisco. This is a significant impact that should be mitigated for example by providing funds to the San Francisco Fire Department Hazardous Materials Unit.*

**Response:** Please refer to the sections within the staff PSA and FSA regarding the insignificant risk of the use, handling, storage and transportation of hazardous materials. Implementation of the Applicant's and Staff's proposed mitigation will result in the safe use, storage, and transportation of aqueous ammonia. In regards to staffing within the City fire department and hazardous materials unit, staff notes that the city has a proposal to move its HazMat Response Team to a location further from industrial areas of the city which use and/or store hazardous materials. This proposal has not been implemented as of the date of this FSA and the City has no definite plan to effectuate the move. Accordingly, staff feels that at this time and in the foreseeable future, the City has adequate hazardous material spill response time and capability in the event of a spill at the proposed power plant location or if a transportation accident should result in a spill. Should the City decide to move the current location of their HazMat Response Team to a more distant location, staff recommends that the CEC Compliance Project Manager reevaluate the response time to the Potrero site.

**CCSF-6B:** *The applicant should be required to implement new processes and technologies such as Ammonia on Demand systems using urea pellets and the SCONOX system.*

**Response:** Staff has conducted an analysis of the use of aqueous ammonia at the proposed power plant and many other proposed power plants throughout the state. Staff has found that the risks of using, storing and transporting aqueous ammonia are insignificant. Indeed, staff has failed to find a single accident or spill of aqueous ammonia either at a Energy Commission-certified power plant or during the transportation to a Energy Commission-certified power plant. Furthermore, staff has not found an environmental injustice with of the use of aqueous ammonia at this proposed facility. Staff has also reviewed the use of dry urea pellets as an alternative source of ammonia for SCR. Staff has found that it is a viable alternative, however, it has not been used extensively in this country nor on a scale of this magnitude. However, if the Commissioners are somehow dissatisfied with the use of aqueous ammonia this alternative is available for consideration.

**CCSF-6C:** *The applicant should use the local guidance document available from the Department of Public Health to prepare the RMP. In addition, the CEC staff should review the hazardous materials delivery route alternatives with the San Francisco Fire Department, evaluate the safest route and impose that route as a Condition of Certification.*

**Response:** The condition of certification requiring an RMP was revised to require that the local guidance document (dated August 1, 2001 from the Hazardous Materials Unified Program Agency of the San Francisco Department of Public Health) be used in the preparation of the RMP.

Please refer to the sections within the staff PSA and FSA regarding the insignificant risk of the use, handling, storage and transportation of hazardous materials. Implementation of the Applicant's and Staff's proposed mitigation will result in the safe use, storage, and transportation of all hazardous materials. Even though an RMP has not been prepared, an Offsite Consequence Analysis (OCA) for aqueous ammonia has been prepared and presented in the AFC. Staff also conducted independent air dispersion modeling to verify the results of the Applicant's OCA. Therefore, staff finds that it can indeed make the statements referred to on page 4.5-5 & 7 of the PSA regarding lack of off-site impacts from a worst-case release of aqueous ammonia.

In regards to delivery route alternatives, staff has recommended a condition of certification which would require that only the approved route (Interstate-280 to Cesar Chavez Street to Third St. to 23rd St. to the plant) be used for the transportation of hazardous materials to the proposed power plant.

## **POTRERO POWER PLANT CITIZEN ADVISORY TASK FORCE (PTF)**

**PTF-3:** *Hazardous materials storage and transportation are not adequately investigated or mitigated.*

**Response:** Local conditions were examined and evaluated in the staff's assessment of hazardous materials use and transportation. Various transportation routes were driven and the presence of curves, traffic signals, and the land use along each route was noted. The result of that inspection was the elimination of the Highway 101 Cesar Chavez off-ramp as an approved hazmat transportation route. Specific data regarding actual accidents of hazardous materials deliveries via trucks in the United States was used to assess transportation risks. There is no database that contains neighborhood specific information on hazardous materials tanker truck accidents. However, the National Response Center does not list any aqueous ammonia tanker truck accidents in California for the past 10 years. Insofar as assessing alternative transportation methods (e.g., over water), staff believes that the weather conditions of San Francisco Bay and the concern about bay protection expressed by BCDP are over-riding concerns that would reduce the viability of building new docking facilities and transporting aqueous ammonia and other hazardous materials over water. Note that staff believes that the transport of aqueous ammonia presents far and away the greatest risk to the public so that if that risk was negligible, all other transport risks were also negligible.

## COMMUNITIES FOR A BETTER ENVIRONMENT (CBE)

**CBE-16:** *The possibility of using dry urea pellets instead of ammonia should be addressed in order to reduce the impacts of ammonia storage and transportation.*

**Response:** Please refer to the sections within the staff PSA and FSA regarding the insignificant risk of the use, handling, storage and transportation of hazardous materials. Additionally staff reviewed the possibility of using dry solid urea pellets instead of aqueous ammonia.

Staff has conducted an analysis of the use of aqueous ammonia at the proposed power plant and many other proposed power plants throughout the state. Staff has found that the risks of using, storing and transporting aqueous ammonia are insignificant. Indeed, staff has failed to find a single accident or spill of aqueous ammonia either at a Energy Commission-certified power plant or during the transportation to a Energy Commission - certified power plant. Furthermore, staff has not found an environmental injustice with the use of aqueous ammonia at this proposed facility. Staff has also reviewed the use of dry urea pellets as an alternative source of ammonia for SCR. Staff has found that it is a viable alternative, however, it has not been used extensively in this country nor on a scale of this magnitude. However, if the Commissioners are somehow dissatisfied with the use of aqueous ammonia at the Potrero Power Plant, this alternative is available for consideration.

## GEORGE GEUNTER/BABETTE DREFKE (GG/BD)

**GG/BD-4:** *The transport of aqueous ammonia via commercial and residential streets has been resisted in several public meetings. A detailed feasibility study and cost analysis for shipping by tanker/barge should be provided by the Energy Commission.*

**Response:** Please see response to **PTF-3**, above.

## CONCLUSIONS AND RECOMMENDATIONS

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Staff's evaluation of the proposed project (with staff's proposed mitigation measures) indicates that hazardous materials use will pose no potential for significant impacts on the public. With adoption of the proposed conditions of certification, the proposed project will comply with all applicable laws, ordinances, regulations and standards (LORS). In response to Health and Safety Code, section 25531 et seq., the applicant will be required to develop an RMP. The RMP will be submitted to EPA, San Francisco County, and staff for evaluation. To insure adequacy of the RMP, staff's proposed conditions of certification require that USEPA, San Francisco County and staff submit the RMP for concurrent review. In addition, staff's proposed conditions of certification also require San Francisco County's acceptance of the RMP and staff's approval of the RMP prior to delivery of any hazardous materials to the facility. With adoption of staff's proposed conditions of certification, the project will also comply with Health and Safety Code, section 41700, and it will not pose any potential for significant impacts to the public from hazardous materials releases.



Staff recommends the Energy Commission impose the proposed conditions of certification, presented herein, to ensure that the project is designed, constructed and operated to comply with applicable LORS and to protect the public from significant risk of exposure to an accidental ammonia release.

## **PROPOSED CONDITIONS OF CERTIFICATION**

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**HAZ-1** The project owner shall not use any hazardous material at the Potrero PP Unit 7 not listed in Appendix C, below, or in greater quantities or strengths than those identified by chemical name in Appendix C, below, unless approved in advance by the City and County of San Francisco and the CPM.

**Verification:** The project owner shall provide to the Compliance Project Manager (CPM), in the Annual Compliance Report, a list of hazardous materials contained at the facility in reportable quantities.

**HAZ-2** The project owner shall provide a Risk Management Plan to the City of San Francisco and the CPM for review at the time the plans are first submitted to the U.S. Environmental Protection Agency (USEPA). The RMP shall be prepared pursuant to US EPA, CAL-ARP, and CCSF Hazardous Materials Unified Program Agency (SOP 5-02 dated August 1, 2001) guidelines. The project owner shall include all recommendations of the US EPA, CCSF and the CPM in the final document. A copy of the final plans, including all comments, shall be provided to the City and County of San Francisco and the CPM once approved by USEPA.

**Verification:** At least sixty (60) days prior to the delivery of aqueous ammonia to the proposed storage facility that will be used in the future to provide aqueous ammonia to the Potrero Power Plant, the project owner shall provide the final plans listed above as accepted by the City and County of San Francisco and approved by USEPA to the CPM for approval.

**HAZ-3** The project owner shall develop and implement a Safety Management Plan for delivery of ammonia. The plan shall include procedures, protective equipment requirements, training and a checklist. It shall also include a section describing all measures to be implemented to prevent mixing of aqueous ammonia with incompatible hazardous materials.

**Verification:** At least sixty (60) days prior to the delivery of aqueous ammonia to the ammonia storage tanks that will be used by the Unit 7 facility in the future, the project owner shall provide a safety management plan as described above to the CPM for review and approval.

**HAZ-4** The aqueous ammonia storage facility shall be designed to either the ASME Pressure Vessel Code and ANSI K61.6 or to API 620. In either case, the storage tank shall be protected by a secondary containment basin capable of holding 150% of the storage volume of one tank plus the volume associated with 24 hours of rain assuming the 25-year storm.

**Verification:** At least sixty (60) days prior to delivery of aqueous ammonia to the storage tanks, the project owner shall submit final design drawings and specifications

for the ammonia storage tank and secondary containment basin to the CPM for review and approval.

**HAZ-5** The project owner shall direct all vendors delivering aqueous ammonia to the site to use only transport vehicles, which meet or exceed the specifications of DOT Code MC-307.

**Verification:** At least sixty (60) days prior to receipt of aqueous ammonia on site, the project owner shall submit copies of the notification letter to supply vendors indicating the transport vehicle specifications to the CPM for review and approval.

**HAZ-6** The project owner shall direct all vendors delivering any hazardous material to the site to use only the route (Interstate-280 to Ceasar Chavez Street to Third St. to 23rd St. to the plant) approved by the CPM.

**Verification:** At least sixty (60) days prior to receipt of any hazardous materials on site; the project owner shall submit to the CCSF Fire department for review and to the CPM for review and approval copies of the required transportation route to be used for transporting hazardous materials.

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## APPENDIX A

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### HAZARDOUS MATERIAL MANAGEMENT

#### BASIS FOR STAFF'S USE OF 75 PPM AMMONIA EXPOSURE CRITERIA

Staff uses a health-based airborne concentration of 75 ppm to evaluate the significance of impacts associated with potential accidental releases of ammonia. While this level is not consistent with the 200-ppm level used by EPA and Cal/EPA in evaluating such releases pursuant to the Federal Risk Management Program and State Accidental Release Program, it is appropriate for use in staff's CEQA analysis. The Federal Risk Management Program and the State Accidental Release Program are administrative programs designed to address emergency planning and ensure that appropriate safety management practices and actions are implemented in response to accidental releases. However, the regulations implementing these programs do not provide clear authority to require design changes or other major changes to a proposed facility. The preface to the Emergency Response Planning Guidelines (ERPGs) states that "these values have been derived as planning and emergency response guidelines, **not** exposure guidelines, they do not contain the safety factors normally incorporated into exposure guidelines. Instead they are estimates, by the committee, of the thresholds above which there would be an unacceptable likelihood of observing the defined effects." It is staff's contention that these values apply to healthy adult individuals and are levels that should not be used to evaluate the acceptability of avoidable exposures for the entire population. While these guidelines are useful in decision making in the event that a release has already occurred (for example, prioritizing evacuations), they are not appropriate for and are not binding on discretionary decisions involving proposed facilities where many options for mitigation are feasible. CEQA requires permitting agencies making discretionary decisions to identify and mitigate potentially significant impacts through changes to the proposed project.

Staff has chosen to use the National Research Council's 30 minute Short Term Public Emergency Limit (STPEL) for ammonia to determine the potential for significant impact. This limit is designed to apply to accidental unanticipated releases and subsequent public exposure. Exposure at this level should not result in serious effects but would result in "strong odor, lacrimation, and irritation of the upper respiratory tract (nose and throat), but no incapacitation or prevention of self-rescue." It is staff's opinion that exposures to concentrations above these levels pose significant risk of adverse health impacts on sensitive members of the general public. It is also staff's position that these exposure limits are the best available criteria to use in gauging the significance of public exposures associated with potential accidental releases. It is, further, staff's opinion that these limits constitute an appropriate balance between public protection and mitigation of unlikely events, and are useful in focusing mitigation efforts on those release scenarios that pose real potential for serious impacts on the public. Table 1 provides a comparison of the intended use and limitations associated with each of the various criteria that staff considered in arriving at the decision to use the 75-ppm STPEL. Appendix B provides a summary of adverse effects, which might be expected to occur at various airborne concentrations of ammonia.

## HAZARDOUS MATERIAL MANAGEMENT

### APPENDIX A TABLE 1

#### Acute Ammonia Exposure Guidelines

Guideline	Responsible Authority	Applicable Exposed Group	Allowable Exposure Level	Allowable* Duration of Exposures	Potential Toxicity at Guideline Level/Intended Purpose of Guideline
IDLH <sup>2</sup>	NIOSH	Workplace standard used to identify appropriate respiratory protection.	300 ppm	30 min.	Exposure above this level requires the use of "highly reliable" respiratory protection and poses the risk of death, serious irreversible injury or impairment of the ability to escape.
IDLH/10 <sup>1</sup>	EPA, NIOSH	Work place standard adjusted for general population factor of 10 for variation in sensitivity	30 ppm	30 min.	Protects nearly all segments of general population from irreversible effects
STEL <sup>2</sup>	NIOSH	Adult healthy male workers	35 ppm	15 min. 4 times per 8 hr day	No toxicity, including avoidance of irritation
EEGL <sup>3</sup>	NRC	Adult healthy workers, military personnel	100 ppm	Generally less than 60 min.	Significant irritation but no impact on personnel in performance of emergency work; no irreversible health effects in healthy adults. Emergency conditions one time exposure
STPEL <sup>4</sup>	NRC	Most members of general population	50 ppm 75 ppm 100 ppm	60 min. 30 min. 10 min.	Significant irritation but protects nearly all segments of general population from irreversible acute or late effects. One time accidental exposure
TWA <sup>2</sup>	NIOSH	Adult healthy male workers	25 ppm	8 hr.	No toxicity or irritation on continuous exposure for repeated 8 hr. work shifts
ERPG-2 <sup>5</sup>	AIHA	Applicable only to emergency response planning for the general population (evacuation) (not intended as exposure criteria) (see preface attached)	200 ppm	60 min.	Exposures above this level entail** unacceptable risk of irreversible effects in healthy adult members of the general population (no safety margin)

1) (EPA 1987) 2) (NIOSH 1994) 3) (NRC 1985) 4) (NRC 1972) 5) (AIHA 1989)

\* The (NRC 1979), (WHO 1986), and (Henderson and Haggard 1943) all conclude that available data confirm the direct relationship to increases in effect with both increased exposure and increased exposure duration.

\*\* The (NRC 1979) describes a study involving young animals, which suggests greater sensitivity to acute exposure in young animals. The (WHO 1986) warns that the young, elderly, asthmatics, those with bronchitis and those that exercise should also be considered at increased risk based on their demonstrated greater susceptibility to other non-specific irritants.



### References for Appendix A, Table 1

AIHA. 1989. American Industrial Hygienists Association, Emergency Response Planning Guideline, Ammonia, (and Preface) AIHA, Akron, OH.

EPA. 1987. U.S. Environmental Protection Agency, Technical Guidance for Hazards Analysis, EPA, Washington, D.C.

NRC. 1985. National Research Council, Criteria and Methods for Preparing Emergency Exposure Guidance Levels (EEGL), short-term Public Emergency Guidance Level (SPEGL), and Continuous Exposure Guidance Level (CEGL) Documents, NRC, Washington, D.C.

NRC. 1972. Guideline for short-term Exposure of The Public To Air Pollutants. IV. Guide for Ammonia, NRC, Washington, D.C.

NIOSH. 1994. National Institute of Occupational Safety and Health, Pocket Guide to Chemical Hazards, U.S. Department of Health and Human Services, Washington D.C., Publication numbers 94-116.

WHO. 1986. World health Organization, Environmental Health Criteria 54, Ammonia, WHO, Geneva, Switzerland.

### Abbreviations for Appendix A, Table 1

ACGIH, American Conference of Governmental and Industrial Hygienists  
AIHA, American Industrial Hygienists Association  
EEGL, Emergency Exposure Guidance Level  
EPA, Environmental Protection Agency  
ERPG, Emergency Response Planning Guidelines  
IDLH, Immediately Dangerous to Life and Health Level  
NIOSH, National Institute of Occupational Safety and Health  
NRC, National Research Council  
STEL, Short Term Exposure Limit  
STPEL, Short Term Public Emergency Limit  
TLV, Threshold Limit Value  
WHO, World Health Organization

## **APPENDIX B**

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### **SUMMARY OF ADVERSE HEALTH EFFECTS OF AMMONIA**

#### **638 ppm**

##### **WITHIN SECONDS:**

- significant adverse health effects;
- might interfere with capability to self rescue;
- reversible effects such as severe eye, nose and throat irritation.

##### **AFTER 30 MINUTES:**

- persistent nose and throat irritation even after exposure stopped;



- irreversible or long-lasting effects possible: lung injury;
- sensitive people such as the elderly, infants, and those with breathing problems (asthma) experience difficulty in breathing;
- asthmatics will experience a worsening of their condition and a decrease in breathing ability, which might impair their ability to move out of area.

### **266 ppm**

#### **WITHIN SECONDS:**

- adverse health effects;
- very strong odor of ammonia;
- reversible moderate eye, nose and throat irritation.

#### **AFTER 30 MINUTES:**

- some decrease in breathing ability but doubtful that any effect would persist after exposure stopped;
- sensitive persons: experience difficulty in breathing;
- asthmatics: may have a worsening condition and decreased breathing ability, which might impair their ability to move out of the area.

### **64 ppm**

#### **WITHIN SECONDS:**

- most people would notice a strong odor;
- tearing of the eyes would occur;
- odor would be very noticeable and uncomfortable.
- sensitive people could experience more irritation but it would be unlikely that breathing would be impaired to the point of interfering with capability of self rescue
- mild eye, nose, or throat irritation
- eye, ear, & throat irritation in sensitive people
- asthmatics might have breathing difficulties but would not impair capability of self rescue

### **22 or 27 ppm**

#### **WITHIN SECONDS:**

- most people would notice an odor;
- no tearing of the eyes would occur;
- odor might be uncomfortable for some;

- sensitive people may experience some irritation but ability to leave area would not be impaired;
- slight irritation after 10 minutes in some people.

**4.0, 2.2, or 1.6 ppm**

- No adverse effects would be expected to occur;
- doubtful that anyone would notice any ammonia (odor threshold 5 - 20 ppm);
- some people might experience irritation after 1 hr.

## **APPENDIX C**

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[Attach AFC Tables 8.12-2, 8.12-3, and 8.12-4]

# LAND USE

Testimony of Jon Davidson, AICP

## INTRODUCTION

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The land use analysis of the Potrero Power Plant (Potrero PP) Unit 7 Project focuses on two main issues: the project's consistency with local land use plans, ordinances, and policies; and the project's compatibility with existing and planned land uses. In general, a power plant and its related facilities have the potential to create impacts in the areas of noise, dust, public health, traffic, and visual resources, as well as other environmental areas. These individual resource topics are discussed in separate sections of this Final Staff Assessment (FSA).

## LAWS, ORDINANCES, REGULATIONS AND STANDARDS (LORS)

### State

The authority to regulate land use and development on private property is delegated to local jurisdictions by the state. As a result, there are no specific state-level land use LORS applicable to the project or the site. Applicable state and federal laws, regulations, and standards germane to specific resource areas, such as air quality or water quality, are addressed elsewhere in this FSA.

### Local

The proposed project site is situated wholly within the City and County of San Francisco (CCSF), and is adjacent to both San Francisco Bay and lands owned by the Port of San Francisco (Port). The land use at the site is regulated by the CCSF. A portion of the site (land within 100 feet of the Bay) as well as submerged bay land that would be affected by the project is also under the jurisdiction of the Bay Conservation and Development Commission (BCDC). The site for the principal part of the generation project is outside BCDC's jurisdictional boundary; however, the proposed cooling water intake and discharge facilities are within BCDC's jurisdiction.

In preparing this FSA, staff reviewed zoning, land use plans, and other development requirements of the CCSF, the Port of San Francisco (Port), and the BCDC.

### **Bay Conservation and Development Commission Review**

Pursuant to the McAteer-Petris Act, BCDC reviews all land use development proposals within the Bay that are on fill or involve new fill, or that are on land within 100 feet of the shoreline. In addition to regulating projects that involve fill (i.e., placement of any material or structures on the bay bottom), BCDC is also responsible for improving public access to the Bay. In accordance with Section 66602 of the McAteer-Petris Act, projects in the Bay or within the 100-foot shoreline band should provide maximum feasible public access to the Bay. Pursuant to Section 66632(f) of the McAteer-Petris Act, projects within BCDC's jurisdiction must be consistent with the *San Francisco Bay Plan*. The policies on public access in the *Bay Plan* state that maximum feasible public

access should be provided in and through every new development in the Bay or on the shoreline, and that the access should be permanently guaranteed.

### **City and County of San Francisco General Plan**

The San Francisco General Plan was adopted in 1996 and has been selectively amended since its adoption. The General Plan is the broadest planning document applicable to the site, expressing broad goals and policies, as well as specific implementation measures, to guide decisions on future growth, development, and conservation. The Potrero PP site is located within the Central Waterfront Area Plan in the General Plan. **LAND USE Figure 1** shows the General Plan designations in this area, including the plant site and the transmission line route.

The General Plan designates the entire waterfront east of Third Street in this area for Heavy Industry, except for discontinuous units of shoreline land that are designated public open space. The Potrero PP site and the transmission line route to Hunters Point Substation are both within the area designated for Heavy Industry.

West of Third Street, between Third Street and Interstate 280 (I-280), the predominant General Plan land use designation is Mixed Industrial/Commercial, with pockets of Public and Light Industry use. Continuing west from I-280, the principal land use designation is Residential, followed by Light Industry, Public, and Neighborhood Commercial uses.

As part of its Better Neighborhoods Program, the CCSF is in the process of formulating a neighborhood plan for the Central Waterfront area (see the discussion below under the heading "Interim and Advance Planning").

### **Planning Code (Zoning Ordinance)**

Zoning is the specific administrative tool used by a jurisdiction to implement its General Plan land use policies. Zoning is often more finely defined than General Plan designations. **LAND USE Figure 2** shows the zoning applicable to the area of the project. The CCSF has zoned the Potrero PP property as M-2 Heavy Industry. This zoning designation applies to all lands bay-ward of Third Street in the vicinity of the power plant. An RH-3 House Character District known as Dogpatch and an NC-2 Neighborhood Commercial zone occur on the east side of Third Street between 22nd and 23rd Streets. Because of housing pressures, the CCSF has allowed a category of use known as "live/work" to occur throughout the city, regardless of the zoning designation. The exceptions are Residential zones and specifically designated Industrial Protection Zones (see the discussion below under "Interim and Advance Planning"). As a consequence, areas designated for a specific use, such as Commercial or Industrial, may also have live/work units situated within them. These live/work units are permitted under commercial rather than residential standards.

Due to concerns about gentrification of working class neighborhoods and criticism that live/work lofts don't provide the affordable family housing needed in the city, the CCSF enacted a six-month prohibition on the construction of new live/work units in February 2001. At that time, the Board of Supervisors established a Live/Work

**LAND USE Figure 1**  
**San Francisco General Plan Map**

**LAND USE Figure 2**  
**San Francisco Zoning Map**

Task Force to provide policy recommendations on live/work units. The moratorium on new live/work units was extended for another six months in August 2001 in order to provide the CCSF with more time to formulate long-range policies for live/work units in the city.

### **Port Plans**

The Potrero PP site is one of the few properties along the shoreline not owned by the Port of San Francisco. While Port plans do not include the property, it is instructive to consider what is planned for nearby Port lands. The shoreline from China Basin to India Basin is identified by the Port as the Southern Waterfront<sup>1</sup>.

The Potrero PP site is in the center of this section of shoreline. Port property north of the Potrero PP site is designated for Mixed Use and Maritime Use. Property near Illinois Street is planned as the Pier 70 Development Opportunity Area, with the potential for a wide range of office/commercial development. Port lands south of the Potrero site are planned for a mix of industrial, maritime, and transportation uses.

Certain aspects of the operation of the existing Potrero PP are governed by agreements with the Port of San Francisco. The power plant owner, Mirant Corp., has an agreement with the Port allowing the temporary use of a portion of Port land for unloading fuel oil at Pier 70 and the delivery of the fuel to the plant through a pipeline. An agreement with the Port also allows the power plant owner to maintain intake and discharge facilities for cooling water over Port-owned land. New intake and discharge facilities for cooling water are proposed as part of the Potrero PP Unit 7 project, which will require a new agreement with the Port to maintain these new facilities on Port-owned land. The Applicant will also need to establish a new agreement with the Port for long-term use of the fuel dock and pipeline. An agreement with the Port is also required for the construction of the transmission line, since portions of the transmission line would be located on Port property – on Illinois Street, near the proposed Islais Creek crossing and further south on Cargo Way.

### **Interim and Advance Planning**

The Central Waterfront is a dynamic area of the city. The CCSF's Planning Department is analyzing pressures on the area for new uses, such as work/live residences, and may consider interim controls on growth in the area. Under a pilot Better Neighborhoods Program, three test areas in the city are being used to develop Area Specific Plans referred to as Neighborhood Plans. The Central Waterfront is one of these test areas, and the proposed Central Waterfront Neighborhood Plan is scheduled to be completed in 2002. The Central Waterfront Neighborhood Plan may include proposed revisions to land use policies in order to promote neighborhood goals and objectives. At a public workshop on September 25, 2001, the CCSF Planning Department introduced land use alternatives for the Central Waterfront and a Preferred Concept Plan. The Planning

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<sup>1</sup> Two designations apply to the Potrero PP site and vicinity. The Port designates its shoreline property from 18th Street south to India Basin as the Southern Waterfront. This includes all waterfront property except the Potrero PP site. The City General Plan designates the shoreline between China Basin and Islais Creek and the adjacent inland area as the Central Waterfront. The two designations overlap to a large degree along the waterfront. Although located between Port properties on the waterfront, as private property, the Potrero PP site is outside the Port's planning jurisdiction.



Department is currently working to incorporate comments received at the September 2001 workshop as part of the preparation of a preliminary draft neighborhood plan, which the CCSF expects to release in early 2002.

One of the objectives of the Central Waterfront Neighborhood Plan is to allow more residential development in the area in response to the increasing demand for housing units, while also preserving as much industrial area as possible. The CCSF Planning Department hopes to formulate a new land use plan for the area that would allow the construction of up to 2,000 new housing units in the Central Waterfront. In the Preferred Concept Plan introduced at the September 2001 workshop, the areas east of Third Street would remain industrial; however, new housing would be mixed with light industrial uses in certain areas west of Third Street (San Francisco Planning Department, 2001).

Given the high value of land in the city, market forces create pressure to convert industrial properties to more profitable uses. As described above, the strong demand for housing in the city has resulted in the infiltration of residential units in the form of live/work lofts into many industrial areas in the city, especially the city's South of Market area. Because competition for land and building space in the city's industrially zoned areas generally favors residential uses, there has been concern that the CCSF's regulations permitting live/work units in industrial areas could erode the city's industrial base, thereby leading to a loss of jobs and a decline in the production, distribution, and repair businesses considered important to the city. To address these concerns, the CCSF established interim zoning controls in 1999 that prohibited residential development in some of the Central Waterfront's industrially zoned areas. These interim controls also established mixed-use areas where residential and live/work units would be encouraged and buffer zones where residential and live/work units would require approval of a conditional use permit. These interim controls are referred to as Industrial Protection Zones (IPZs) and Mixed Use Housing Zones Within Industrially Zoned Land.

The interim IPZ and Mixed Use Housing zoning controls expired on August 4, 2001. The CCSF Planning Commission recommended approval of a permanent IPZ Special Use District on September 6, 2001. The permanent IPZ Special Use District ordinance was reviewed by the Board of Supervisors' Housing, Transportation, and Land Use Committee and forwarded to the full Board for action with a recommendation for approval. The Board of Supervisors approved the permanent IPZ Special Use District ordinance on January 7, 2002. The Potrero PP site is not within the boundaries of the permanent IPZ and, therefore, future residential development can be permitted in the industrially zoned areas in the vicinity of the Potrero PP under the new ordinance.

For a list of proposed and recently built projects in the general vicinity of the Potrero PP, please see the discussion under the heading "Cumulative Impacts" later in this section.

The CCSF and the Port are considering an historic district designation for the area to preserve and enhance the historic and architectural character of many of the industrial and maritime structures found there.

## **Design Review**

The Urban Design Element of the San Francisco General Plan provides design review guidance for major projects, setting out objectives and policies to guide and inform the design review process. For industrial and commercial projects, design review is conducted informally by the CCSF during the permitting process. Considerations include bulk, height, shadow, vistas, facade treatment, and similar elements that affect the appearance of a development and its relationship to neighboring land uses and views. The Potrero PP site is located within a General Plan area where design guidelines allow maximum building heights ranging from 44 to 88 feet. Port areas south of the Potrero PP site allow maximum building heights ranging from 89 to 160 feet in height. (SF General Plan, Urban Design Element, pages I.5.34 & 35)

## **ENVIRONMENTAL SETTING**

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The Potrero PP site is situated in southeastern San Francisco approximately 2,000 feet east of I-280, in the midst of an industrial and port area. It is bounded by Illinois Street and San Francisco Bay, between 22nd and 23rd Streets. Site access is by way of Humboldt Street, off of Illinois Street. The Potrero PP property houses four operating generation units, Units 3, 4, 5, and 6. Three fuel tanks are located on the Potrero PP site. Two are emergency fuel storage for Unit 3, should natural gas service be interrupted and Unit 3 is forced to burn fuel oil. The third (center) tank provides distillate fuel for the smaller peaker units (nos. 4, 5, and 6). A building formerly enclosing a decommissioned and previously removed unit would be demolished to make way for the proposed Unit 7. Energy production at the site dates from the late 19th century.

The Potrero PP site is on one of the few bayside locations in the CCSF's Central Waterfront Plan Area that is not Port property and, therefore, not within the Port's Southern Waterfront Plan. In April 1999, the Potrero PP facility was sold to Southern Energy California (which has subsequently changed its name to Mirant Corp.) by the Pacific Gas and Electric Company (PG&E). The Potrero PP Unit 7 would be operated by Mirant Potrero LLC, a subsidiary of Mirant Corp.

Approximately 6.5 acres of the 20-acre Potrero PP site would be used for the new Unit 7. The generation unit would be erected on the part of the site now occupied by a group of abandoned buildings known as the Station A Complex. These vacant buildings have been judged to be seismically unstable and are planned to be removed as part of the siting case. The design includes twin exhaust stacks 180 feet tall at the east side of the facility. In addition to a new 115 kV switchyard onsite, transmission interconnections would be made to two existing PG&E Substations -- one to the adjacent Potrero Substation, and the other to the PG&E Hunters Point Substation, 1.8 miles distant from the site. The latter substation would be reached by two 115 kV underground transmission circuits installed in Illinois Street, Cargo Avenue, and Jennings Street. The cable route would be directionally bored beneath Islais Creek.

## **SITE AND VICINITY DESCRIPTION**

The entire Potrero PP site covers 20 acres between Illinois Street and the Bay. Existing generation assets at the site include Unit 3, a 206-MW steam turbine located near the

bay, and Units 4, 5, and 6, three 52-MW combustion turbines that serve as "peaker" units. These three units are located mid-site and use distillate fuel. The proposed Unit 7 would be located between the peaker units and the existing PG&E Substation on Illinois Street.

### **Existing Adjacent Uses**

**LAND USE Figure 3** shows the existing land uses in the project vicinity. Potentially sensitive land uses within the affected area are shown in **LAND USE Table 1**. This table does not list residential properties or live/work units, which are discussed below.

Industrial and commercial uses predominate in the immediate site vicinity. Immediately north of the Potrero PP site is Pier 70, a Port of San Francisco property. Current uses at Pier 70 include general industry within an M-2 Heavy Industry zone. The eastern edge of the Potrero PP site abuts San Francisco Bay. The south side of the property borders 23rd Street, across which is found the old Spreckles Sugar building (vacant), an Airborne Express facility, and an existing recycling facility. The west side of the property fronts on the existing PG&E Potrero Substation and Illinois Street, which has a rail line in it. Immediately across from the site on Illinois Street is a nearly block-long warehouse building that is being converted for commercial use.

Third Street parallels Illinois Street one block west of the site. This marks the western boundary of the industrial area within which the Potrero PP is situated.

The closest residentially zoned areas occur south and west of the Potrero PP. The Bayview-Hunters Point neighborhood is slightly over one mile south of the site, at its nearest point. To the west, closer residential areas occur on Potrero Hill, along Third Street, and in the small community known as Dogpatch on Third Street near 22nd Street. Dogpatch is the nearest residentially zoned area to the project (approximately 1200' feet to the northwest).

The relative scarcity of housing throughout San Francisco has led the CCSF to allow live/work lofts in areas not zoned for residential use. From 1997 through 2000, the San Francisco Planning Commission approved approximately 3,000 live/work units in the city. In the year 2000, a total of 1,626 new housing units were constructed in the city, of which 464 were live/work units. Reflecting the trend of building residential loft units in non-residential areas, San Francisco's 2000 Housing Inventory (a statistical report of San Francisco's housing production trends and projections) indicates that 38 percent of new housing construction occurred in industrial and heavy commercial zoning districts, 19 percent occurred in South of

**LAND USE Figure 3**  
**Existing Land Uses**

**LAND USE Table 1**  
**Table of Potentially Sensitive Land Uses**  
**(Use Table 8.4-2 on page 8.4-18 from Potrero AFC)**

Market area zoning districts, and 11 percent occurred in neighborhood commercial zoning districts.

The Central Waterfront area has also experienced an increase in residential units in non-residential areas through the development of live/work units. As a result, the residential population in the vicinity of the Potrero PP has increased through infiltration of live/work units. Since 1990, 25 dwelling units and 325 live/work units have been developed in the Central Waterfront. The 1990 Census reported only 214 dwelling units in the census tracts covering the areas east of I-280.

### **Planned Local Land Use Changes**

The CCSF and the Port of San Francisco are engaged in extensive planning and development activities in the vicinity of the Potrero PP site.

North of the Potrero PP site, at the Port of San Francisco's Pier 70 project, a Construction/Demolition Material Recovery Facility (MRF) is negotiating a development within an existing building. The Pier 70 plan also calls for mixed uses in the future, including approximately 610,000 square feet of commercial office and/or research and development space; 100,000 feet of retail/commercial space; and 240,000 square feet of public access and recreational uses. There is no set schedule for this development; however, it is anticipated that about 150,000 square feet of arts and non-profits space is expected to be developed within the next two years, and 500,000 square feet of commercial space will be developed in the next 3-5 years.

To the south of the Potrero PP site, the CCSF's Illinois Street Rail-Truck Bridge is planned for construction by the end of 2003. This intermodal bridge will improve transportation within the Port's lands, specifically improving access to the Port's North Container Terminal on the north side of Islais Creek Channel.

On the south side of Islais Creek Channel, along Amador Street, a ready-mix concrete plant is planned between an existing sand processing plant and a rendering plant. The ready mix plant would include two 65-foot tall storage/mixer silos and other facilities. An asphalt plant is also planned on Amador Street. These Amador Street projects are awaiting final EIR certification to proceed.

To the west, the San Francisco Municipal Railway (MUNI) is began construction of the Third Street Light Rail Extension in the Fall of 2001. Station stops along the route are expected to encourage commercial and, perhaps, residential development. In support of the new transit line, MUNI is constructing a maintenance and rail car storage facility on the Western Pacific site, approximately 1,000 feet south of the Potrero PP site. Construction work has begun on this site.

## **ASSESSMENT OF IMPACTS**

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The Guidelines to the California Environmental Quality Act (CEQA), Appendix G, note that a project may have a significant effect on land use if the project will, among other things:

- Physically divide an established community, or,
- Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project.

A project may also have a significant impact on land use if it would create unmitigated noise, dust, public health hazard or nuisance, traffic or visual impacts, or when it precludes or unduly restricts existing or planned future uses.

## **COMPLIANCE WITH LAWS, ORDINANCES, REGULATIONS AND STANDARDS**

When determining if a project is in conformance with ordinances or regulations, Energy Commission staff typically meets and consults with applicable agencies to determine conformity and, when necessary, "to attempt to correct or eliminate any noncompliance" (Pub. Resources Code, Sect. 25523(d)(1)). The land use laws, ordinances, regulations, standards (LORS) and policies applicable to the project have been analyzed below to determine the extent to which the Potrero PP Unit 7 project is consistent or at variance with each requirement or standard.

### **Bay Conservation and Development Commission San Francisco Bay Plan**

The BCDC has jurisdiction over all bay fill and over land within 100 feet of the shoreline. The proposed intake and diffuser discharge system in this area would be considered fill by BCDC. On a case-by-case basis, BCDC negotiates mitigation, if needed, for bay fill projects. Mitigation may be required on site, if feasible, or off site. Please see the **WATER AND SOIL RESOURCES** and **AQUATIC BIOLOGICAL RESOURCES** sections of this FSA for discussions of impacts related to bay fill.

Improving public access to the Bay is an important objective of the BCDC. The Bay Trail plan in the project vicinity designates Illinois Street as the trail route because of a lack of shoreline access in this area. Where feasible, BCDC requires access to be provided proportional to the impact on access of a proposed project. Requirements for providing maximum feasible public access to the Bay are determined by BCDC on a project-specific basis.

On October 4, 2001, the BCDC adopted a set of findings and recommendations for the Potrero PP Unit 7 project addressing the project's consistency with the McAteer-Petris Act and San Francisco Bay Plan. With regard to public shoreline access, the BCDC recommended that the Energy Commission impose conditions requiring the following:

- Establishment of a 2.25-acre shoreline park and linear park area along the southern edge of the Potrero PP site at the eastern end of 23<sup>rd</sup> Street exclusively for unrestricted public access for walking, bicycling, sitting, viewing, picnicking, and related purposes.
- Installation of a minimum 10-foot-wide, landscaped, all-weather path along the shoreline connecting the new public access south of the project site (between 23rd Street and the Bay) to any future public access north of the project site. This new pathway would be installed when shoreline access opens on the adjacent property

to the north and when changes in the location and/or operation of the Unit 3 facilities at the power plant would accommodate safe access.

- Installation of public improvements along Illinois Street from 23rd Street to 22nd Street, including landscaping, Bay Trail signs, and bike lanes on both sides of the street.

### **San Francisco General Plan**

The San Francisco General Plan contains ten elements, which set forth goals, objectives, and policies for the physical development of the city. The General Plan also includes Area Plans with objectives and policies for specific geographic areas of the city. The project site is in the Central Waterfront planning area that extends from Pier 48 in the north to Islais Creek in the south. The South Bayshore Area Plan contains land use policies and objectives governing areas south of Islais Creek.

The objectives and policies for the Central Waterfront are enumerated in the General Plan. The overall goals are to:

1. Increase employment opportunities for San Francisco's unemployed and under employed residents;
2. Enhance the working environment to stimulate business growth; and
3. Improve the area's appearance and attractiveness.

The Land Use, Industry, and Urban Design elements of the General Plan are applicable to the land use analysis of the project. The objectives and policies for these elements that are germane to the Potrero PP Unit 7 proposal are listed below. Objectives and policies that do not relate to the Unit 7 proposal have been omitted.

**Objective 1:** Strengthen and expand land uses essential to realizing the economic potential of the subareas. [The Potrero site is within the Central Basin subarea of the Central Waterfront Area Plan.]

- Policy 1: Encourage the intensification and expansion of industrial and maritime uses.
- Policy 2: Preserve and protect the subareas as a land base for San Francisco industry. Prevent the conversion of land needed for industrial or maritime activity to non-industrial use.
- Policy 3: Promote new development which has minimal adverse environmental consequences. Assure that the adverse environmental impacts of new development are fully mitigated.

**Objective 2:** Maintain and develop additional uses on land determined to be surplus to industrial and maritime needs.

- Policy 1: Preserve existing residential uses and develop limited new housing.



- Policy 2: Retain existing commercial uses and expand as needed to serve increases in the working and residential populations.
- Policy 3: Improve, expand, and develop recreational areas at established public access points along the waterfront enabling public use and enjoyment of the shoreline.

**Objective 3:** Retain, expand and protect industrial activity.

- Policy 1: Promote industrial expansion through maximizing and intensifying the use of existing facilities and properties, rehabilitating older industrial structures, and developing vacant land with industrial uses.
- Policy 3: Develop and promote training programs to target local residents for employment opportunities resulting from new economic development.
- Policy 8: Avoid encroachment of incompatible land uses on viable maritime-oriented and other industrial activity by appropriately zoning and mapping industrial districts. Resolve potential land use conflicts in a manner that recognizes the importance of industrial activity to the well-being of San Francisco.
- Policy 11: Attract new industries that create employment opportunities for City residents, add tax revenues in excess of public service costs, and strengthen and diversify San Francisco's economic base.

**Objective 10:** Achieve an aesthetic urban form consistent with the economic development of the subareas.

- Policy 1: Reinforce the visual contrast between the waterfront and hills by limiting the height of structures near the shoreline. Relate the height and bulk of new structures away from the shoreline to the character of the topography and existing development.
- Policy 2: Protect and create views of the downtown skyline and the Bay. Design and locate new development to minimize obstruction of existing views.
- Policy 3: Encourage the rehabilitation of architecturally or historically significant buildings with reuse potential.
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The Central Basin Subarea, which is the waterfront area east of Third Street and north of Twenty-fifth Street, has additional, specific objectives and policies applicable to it. Those germane to the Potrero PP are listed below.

**Objective 16:** Retain and expand industrial uses.

- Policy 2: Assure that any power plant expansion on the Pacific Gas and Electric Company [now Mirant Corp.] site will provide additional employment and will not adversely affect the environment.

**Objective 18:** Relate the scale of new development to San Francisco's distinctive hill form, to the adjacent waterfront, and to existing development.

- Policy 1: Minimize blockage of private and public views and maintain to the extent feasible, sightlines from Potrero Hill and Mission Bay to the waterfront and downtown.

### **San Francisco Planning Code (Zoning Ordinance)**

The Potrero PP site is within an M-2 Heavy Industry use zone. Permitted uses include steam power plants. Because the Planning Code specifically cites steam power plants as permitted uses but does not identify any other type of power plant as being permitted, staff requested a determination from the CCSF's Zoning Administrator as to whether a combined cycle, gas-fired power plant would be considered a permitted use in the M-2 zoning district. In a letter dated August 8, 2001, the Zoning Administrator determined that the type of power plant proposed by the Applicant is permitted in the M-2 district. The Zoning Administrator further stated that other types of power plants would also be permitted in the M-2 district because the "steam" reference is outdated due to the fact this Code section has not been updated in many years.

The site is within a 40-X Height and Bulk District, which imposes on development a height limit of 40 feet and a floor area ratio (FAR) of 5:1 (meaning a building may have a floor area equal to up to five times the site's square footage). The two exhaust stacks exceed the Height criteria for the zoning district; but structures and equipment necessary for industrial operations are exempt under provisions of the CCSF's Planning Code. The Potrero PP proposal meets the requirements of the industrial zoning district and is exempt from this particular standard.

### **San Francisco Design Review**

Design review for industrial projects is conducted by the assigned City Planner. It is informal and relies on guidance provided in the General Plan. There is no specific design review checklist applicable to industrial projects. The assigned planner can call on an internal design review committee if he or she desires.

The proposed project complies with the laws, ordinances, and regulations discussed above. However, at the time this FSA was prepared, the BCDC had not yet determined what provisions should be made by the applicant for public access to the waterfront or for mitigation of impacts associated with the installation of facilities in the bay bottom.

## **COMPATIBILITY WITH EXISTING AND PLANNED LAND USES**

### **Power Plant Site**

Power generation is an existing use at the Potrero PP site. The site is within a Heavy Industry zone and is bounded by industrial and port activities to the north and south. To the west, an existing structure on Illinois Street is being converted for commercial (office) use. The proposed project represents further development of a site already committed to industrial use and, therefore, would not introduce a new industrial use into a non-industrial area. The site and neighboring waterfront properties are designated in the General Plan and the Planning Code for heavy industry use. Current CCSF land

use policies, as expressed in the San Francisco General Plan and the Central Waterfront Area Plan, indicate that industrial uses are planned to continue in this area in the future (Please note that the CCSF is currently in the process of formulating a neighborhood plan for the Central Waterfront area, which may result in proposals to change current land use designations).

Mixed commercial uses are encroaching on the area and, to the extent that land is not valued for industrial or port activities, Port officials are accommodating these changes within future plans being drafted or in the preliminary stages of development. Residential uses have also encroached on the area due to the fact that live/work units are allowed in most areas of the city regardless of zoning. Many live/work units have been approved in the vicinity of the Potrero PP site in recent years. These are being allowed in full knowledge of the industrial and port nature of the existing land uses. Due to concerns about encroachment of residential units on existing industrial areas, the CCSF has established a permanent Industrial Protection Zone that would exclude residential uses (see the discussion under the heading “Interim and Advance Planning” in the preceding LORS section). The Potrero PP is not located within the boundaries of the Industrial Protection Zone.

The construction lay down area for Potrero PP Unit 7 would be immediately east of the project site within the boundaries of the Potrero PP site and, therefore, would not conflict with existing or planned land uses. Temporary, construction-related impacts, such as increased noise and dust, may affect adjacent land uses. With mitigation, these construction impacts are not expected to be significant. Please see the **AIR QUALITY** and **NOISE** sections of the FSA for discussions of impacts and mitigation. Staff has found that operation of the Potrero PP Unit 7 would not cause significant, unmitigated adverse noise, dust, public health hazard or nuisance, or traffic impacts on nearby land uses.

The project would not alter any existing Bay waterfront access opportunities for the public; however, there may be opportunities to improve Bay access at the site or in the vicinity. The development of cooling water intake and discharge facilities constitute bay fill and may require some form of mitigation on site or off site. An agreement with the Port of San Francisco to allow new intake and discharge facilities on Port-owned “intertidal” land will need to be obtained for the Potrero PP Unit 7 project.

### **Electrical Transmission Lines**

The Potrero PP project would require offsite linear facilities (i.e., an underground transmission line to the PG&E Hunters Point Substation). This linear facility would be underground within public street rights-of-way and would be bored under Islais Creek. While construction would disrupt traffic along the transmission line route, it would have not adverse impact on land use following development. The route is located within an industrially zoned area.

### **Agriculture**

The proposed plant site is located in San Francisco. The site and vicinity are urbanized and fully developed. There are no significant agricultural uses in the vicinity of the site

or the linear electrical transmission corridor; therefore, there will be no impact on agriculture.

## CUMULATIVE IMPACTS

A cumulative impact consists of an impact that is created as a result of the combination of the proposed project together with other projects causing related impacts. When the proposed project is viewed together with the effects of other projects in the area, cumulative impacts may be significant. A number of projects are envisioned for development in the Potrero PP vicinity that could contribute to cumulative effects.

These include new residential and commercial projects in the vicinity of the Potrero PP site, as well as various public works projects and one major new mixed-use development project (Mission Bay). **LAND USE Table 2** presents a list of recently constructed projects in the vicinity of the Potrero PP, as well as proposed projects under review by the CCSF. The locations of new residential and commercial projects in the Central Waterfront area, as well as other projects in the general vicinity, are displayed in **LAND USE Figure 4**. Significant projects in the general vicinity of the Potrero PP site include the following:

- **Pier 70.** Immediately north of the Potrero PP site, extensive development of port, industrial, and commercial activities is envisioned for Pier 70, an established industrial and port area. Portions of the Pier 70 site that front along Illinois Street are planned for mixed commercial opportunities. There is no specific schedule for the Pier 70 development, although about 650,000 square feet of floor area is anticipated to be built in the next five years.
- **MUNI Metro East Light Rail Maintenance and Operations Facility.** Approximately 1200 feet south of the Potrero PP site, MUNI is constructing a new facility for the storage, maintenance, and operation of MUNI's new light rail vehicles. The facility will consist of a main shop and administration building, a paint and body shop building, a small reception structure, a vehicle storage yard, and parking lot.
- **MUNI Third Street Light-Rail Transit Line.** Along Third Street, one block west of the Potrero PP site, MUNI plans to construct a light-rail transit line in the street. This construction will require underground electric line installation as well as in-street surface construction. Development of the MUNI project could coincide with construction of the Potrero PP project. Construction is scheduled to begin in October 2001.
- **Illinois Street Rail-Truck Bridge.** To the south of the Potrero PP site, the CCSF's Illinois Street Rail-Truck Bridge is planned for construction by the end of 2003. This intermodal bridge will improve transportation within the Port's lands, specifically improving access to the Port's North Container Terminal on the north side of Islais Creek Channel.
- **Rebuilding of the San Francisco General Hospital Medical Center.** In accordance with California Senate Bill 1953, which requires all California acute care hospitals to perform seismic improvements to existing buildings, the San Francisco General Hospital's Main Building will be rebuilt so that a new conforming building will be in place by the year 2013. The San Francisco General Hospital is located along Potrero Avenue west of Highway 101, between 22<sup>nd</sup> and 23<sup>rd</sup> Streets.

- **Mission Bay.** Mission Bay is a 303-acre redevelopment project located approximately one-half mile north of the Potrero PP site, generally north of Mariposa Street and east of Interstate 280. Mission Bay is planned for approximately 6,000 housing units and over 10,000 residents. The development will also include over 5 million square feet of office, research, and manufacturing uses; 750,000 square feet of retail; 45 acres of parks and recreation; and a 500-room hotel. A new 43-acre health sciences campus for the University of California at San Francisco is currently under development at Mission Bay and will eventually contain 2.65 million square feet of space for research, instruction, and supporting uses.
- **Hunters Point Naval Shipyard Superfund Site cleanup and redevelopment project.** The former Hunters Point Naval Shipyard is located approximately 1.2 miles southwest of the Potrero PP site. The existence of contamination at the shipyard facilities was confirmed in 1987 and the shipyard has been on the National Priorities List since 1989. The Navy is currently in the process of remediating contamination at the shipyard. When the cleanup is complete, the property will be transferred to the CCSF for reuse. The CCSF has designated a portion of the shipyard property as a redevelopment project area and adopted a Redevelopment Plan in 1997. The Redevelopment Agency selected a master developer for the project in 1999 and approved a Preliminary Development Concept Plan. No new development has yet been initiated at the shipyard, pending transfer of the property from the Navy.
- **Hunters Point Power Plant.** The Hunters Point Power Plant is an existing power plant owned by PG&E, which is located at 1000 Evans Avenue, about 0.5 miles northwest of the Hunters Point Naval Shipyard in the southeast portion of San Francisco. The Hunters Point Power Plant consists of steam boilers designed to run continuously for long periods and distillate-fired combustion turbines designed to meet emergency conditions and/or back up the steam units. Combined, the Potrero and Hunters Point Power Plants supply approximately 40 percent of the San Francisco load during all peak and partial peak hours.

**LAND USE Table 2**  
**Proposed and Recently Built Projects in the Vicinity of the Potrero Power Plant**

Address	Land Use	Current Zoning	Recently Built Units	Proposed Units	Proposed Commercial Sq. Ft.
2092 Third Street	Mix Residential	M-2	3	17	
635 Tennessee Street	Live/Work	M-2	16		
691 Tennessee Street	PDR	M-2		16	
655 Tennessee Street	Vacant	M-2		16	
2002 Third Street, 595 Mariposa	Vacant	M-2		40	
2030 Third Street	Live/Work	M-2	20		
Third Street	Live/Work	M-2	16		
601 Mariposa Street	PDR	M-2		18	
1189 Tennessee Street	Residential	NC-2		8	3,400
729 Tennessee Street	PDR	M-2		0	36,600
2196 Third Street	PDR	M-2		24	5,000
2101 Third Street	Residential	M-2		20	
825 Minnesota Street	Residential	M-2	10		
993 Tennessee Street	PDR	M-2		10	3,100
98 Pennsylvania Avenue	Retail/Office	M-2/IPZ			38,522
631-639 Pennsylvania Avenue				10	
643 Pennsylvania Avenue				2	
647 Pennsylvania Avenue				2	
699 Pennsylvania Avenue				10	
701 Pennsylvania Avenue				18	
1128 Tennessee Street	Public	P	3	6	
1120-22-24 Tennessee Street				3	
1126-28-30 Tennessee Street	Public	P	2	3	
1177 Tennessee Street	Residential	NC-2	18	2	
2572 Third Street	Residential	NC-2	2	11	4,000
1169 Tennessee Street				2	
1380 25 <sup>th</sup> Street	Vacant	M-1		0	30,587
1050 Iowa Street	Vacant	M-1		26	
1100 25 <sup>th</sup> Street				0	29,915
1228 25 <sup>th</sup> Street	Vacant	M-2		4	
1278 Indiana Street	PDR	M-2		6	
1200 Minnesota St, 1209 Indiana St				40	
1099 23 <sup>rd</sup> Street, 1200 Minnesota St				20	
1011 23 <sup>rd</sup> Street, 1200 Minnesota St				20	
1207 Indiana Street aka 1200 Minnesota Street				20	
1281 Indiana Street	PDR	M-2		0	31,597
1325 Indiana, 1310 Minnesota				78	
1325 Indiana Street				48	
1310 Minnesota Street				30	
1388 Tennessee Street				15	
1300 Illinois Street				175	
1415 & 1405 Indiana Street	Residential	M-2	3	18	
3000 Third Street	PDR	M-2		0	224,000
598 Missouri Street	Vacant	RH-2		11	
1588 & 1598 Indiana Street	Vacant	M-2		24	
1568 Indiana Street	Live/Work (formerly PDR)	M-2		12	
1578 Indiana Street	Residential	M-3		12	

PDR = Production, Distribution, and Repair

Source: San Francisco Planning Department, June 27, 2001. Updated July 27, 2001.

**LAND USE Figure 4**  
**Proposed, Recently Built, and Other Related Projects in the Vicinity of the Potrero**  
**Power Plant**

The Port of San Francisco prepared the Waterfront Land Use Plan to promote expansion of cargo and maritime uses on Port lands, and to enhance wetlands, public access, and open space. In 2000, the Port prepared a Supplemental EIR for the Waterfront Land Use Plan addressing specific proposals for interim uses, long-term uses, and capital improvements in the Southern Waterfront, which includes the waterfront area in the vicinity of the Potrero PP. Proposals in the general vicinity of the Potrero PP included:

- A construction material recycling material facility at Pier 70
- A concrete ready-mix facility, including bulk cargo barge and rail transport, at Pier 80
- The Illinois Street Rail-Truck Bridge (discussed above)
- Pier 70 Maritime Reserve (general industrial and maritime uses)
- Pier 70 Opportunity Area (about 16 acres of mixed use commercial, public access, and recreational maritime uses, discussed above).

As described previously under the heading “Existing Adjacent Uses” in the Environmental Setting section, a substantial amount of residential development has occurred in the Central Waterfront area in recent years, including numerous live/work projects in non-residential areas. The nearest proposed residential project in the vicinity of the Potrero PP is an application for a live/work project at 1300 Illinois Street (across the 23rd and Illinois intersection from the Potrero PP site). The project currently proposes to construct 175 new residential units. Other recently constructed or proposed residential projects in the Central Waterfront area are listed in **LAND USE Table 2**.

These and other projects proposed or planned in the vicinity will permanently increase traffic from employees, customers, suppliers, and visitors to the various sites. Construction period impacts will be most significant with regard to traffic disruption from in-street trenching and construction. The underground installation of linear electrical facilities along Illinois Street and along Third Street (the proposed transmission line to Hunters Point and the MUNI underground electrical system, respectively) in an overlapping timeframe could simultaneously disrupt both of these parallel streets, congesting local traffic.

The CCSF has requested that MUNI and the applicant coordinate those linear elements of their projects that require excavations in public rights-of-way. Such coordination could include co-location of facilities to minimize costs to both parties and to minimize traffic disruption in the neighborhood.

## **ENVIRONMENTAL JUSTICE**

Staff has reviewed the Census 2000 information that shows the minority population is greater than 50 percent within a six-mile radius of the proposed Potrero PP (please refer to **SOCIECONOMICS Figure 1** in this Staff Analysis), and Census 1990 information that shows the low-income population is less than fifty percent within the same radius. Environmental justice impacts related to land use are generally associated with land use compatibility issues. These compatibility issues tend to be



localized, generally affecting land uses in close proximity to each other. Land use conflicts usually result from noise, hazards, odors, and visual impacts that affect neighboring properties. Therefore, the degree to which these issues result in significant impacts to the surrounding area determines whether potential land use incompatibilities are likely to occur.

While there are concentrations of minority or low-income populations in the general vicinity of the Potrero PP site, no significant unmitigated adverse impacts have been identified that would cause land use incompatibilities. Based on information collected during the course of this analysis from community members and from governmental sources, staff has determined that, with the implementation of mitigation proposed under staff's proposed Conditions of Certification, there would be no unmitigated impacts that could cause any significant land use incompatibilities. Since no significant land use incompatibilities are expected with the implementation of the proposed Conditions of Certification, there are no land use environmental justice issues.

## **FACILITY CLOSURE**

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At some point in the future, the project will cease operations and close down. At that time, it will be necessary to ensure that closure occurs in such a way that public health and safety and the environment are protected from adverse impacts.

The planned life of the generation facility is 40 years (AFC pg. 4-1). Economic conditions may lengthen or shorten this time span. When preparing to close the facility, the applicant will submit a Facility Closure Plan to the Energy Commission for review and approval at least twelve months prior to the proposed closure. At the time of closure, all then-applicable LORS will be identified and addressed in the closure plan.

There are two other circumstances under which a facility closure can occur: unexpected temporary closure and unexpected permanent closure. Staff has not identified any LORS from a land use perspective that the applicant would have to comply with in the event of an unexpected temporary or unexpected permanent closure of the project.

## **MITIGATION**

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To mitigate the potential for traffic disruption in the Third Street/Illinois Street vicinity during construction of linear facilities in public rights-of-way, staff has proposed **LAND-1** as a condition of approval. This condition would require coordination of planning and, if feasible, co-development of subsurface linear facilities that are required by Potrero PP and MUNI projects.

To preclude conflicts between boring under Islais Creek and the potential footings for the Illinois Street Rail-Truck Bridge proposed across the creek, **LAND-2** has been proposed as a condition. This would require coordination between the CCSF and the project owner to ensure minimal conflicts, if the underground transmission line and the bridge are coincident.

**LAND-3, LAND-4, and LAND-5** have been proposed to increase public access to the Bay, improve Bay Trail conditions along Illinois Street, and to create a new 2.24-acre shoreline park at the eastern end of 23<sup>rd</sup> Street. These proposed conditions are consistent with the October 4, 2001, BCDC approval of the “Staff Recommendation on the Commission’s Report to the California Energy Commission on the Potrero Power Plant Expansion”.

## **RESPONSE TO PUBLIC AND AGENCY COMMENTS ON THE PSA**

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### **CITY AND COUNTY OF SAN FRANCISCO (CCSF)**

**CCSF-7A:** *The land use impacts of the proposed project area are underestimated because the PSA fails to analyze the extent of land use conflicts and how the project’s expansion would contribute to increasing incompatibilities between land uses in the future. The PSA’s Land Use section also does not make reference to the considerable land use changes that will be generated by Redevelopment Agency projects in the vicinity of the proposed power plant. Mission Bay, for example, will include 6200 units of housing. Redevelopment Agency plans for substantial expansions in housing and commercial development in the Bayview/Hunters Point area are also underway.*

*The PSA does not fully and adequately consider how construction of a new, expanded power plant conflicts with future, planned land uses in the area. The Better Neighborhoods 2002 planning effort, now underway, will include provisions intended to increase population density in the Central Waterfront. However, construction of the power plant will dedicate the site to intensified industrial use for at least another forty years, and may limit the possibilities for developing adjacent land use for the same period. The possibility that the Central Waterfront could become a new urban neighborhood is thus diminished by the continued presence and expansion of a power plant at the proposed location. Therefore, the proposed project could have a significant impact on housing demand in San Francisco by limiting the possibilities for construction of housing. Current San Francisco planning efforts stress the need to link land use to transit and to provide housing and neighborhood services in proximity to transit. The City’s investment in 3<sup>rd</sup> Street Light Rail is being potentially comprised because the presence of the power plant could limit housing production where it is most appropriate – near transit.*

*The PSA fails to adequately acknowledge or address the substantial increase in housing and live/work units in the project vicinity over the past decade. The PSA also inaccurately portrays the project vicinity as almost exclusively industrial. The historic industrial character of the Central Waterfront is changing to a mixture of industrial, commercial and residential, live-work uses. The analysis of the proposed power plant expansion projects impacts should recognize the diversity of uses in the area, especially the residential aspects of existing live-work developments in the immediate vicinity. In addition, the PSA, in both the Land Use section and the assessment of cumulative impacts in the Air Quality section, does not fully account for the extensive additional industrial development expected in the area which is identified in the Southern Waterfront Supplemental FEIR. Extensive mixed-use development is proceeding in*

*nearby Mission Bay, but this is also not addressed in the PSA. Finally, the mention in the PSA, without analysis for evaluation of the impact, of the Better Neighborhoods Central Waterfront planning study, does not adequately convey its objective of resolving competition between industrial and residential uses in the project vicinity.*

*The CEC should require the Applicant to contribute to community efforts to enhance the livability of the affected neighborhoods by contributing resources to enhance and maintain existing public access and open space areas and to encourage less polluting means of transportation (such as the construction of bicycle lanes).*

**Response:** Significant portions of both the PSA and FSA address potential land use conflicts. The **Air Quality, Hazardous Materials Management, Noise, Public Health, and Visual Resources** sections of the PSA and FSA primarily address the proposed project's potential impacts on surrounding areas, and other sections of the PSA and FSA also address effects on surrounding areas to a lesser degree. Combined, these sections provide substantial analysis of the project's potential to result in land use conflicts and incompatibilities. These analyses are referenced in this section under the heading "Compatibility with Existing and Planned Land Uses." In addition, the PSA describes the project's consistency with applicable existing land use policies and regulations. The discussion of other planned or proposed projects in the general vicinity of the project site has been expanded for the FSA (see the discussion of "Cumulative Impacts" above).

The CCSF General Plan's Commerce and Industry Element and the Central Waterfront Area Plan clearly establish that the Central Waterfront east of Third Street is an area planned for industrial and maritime uses. The Central Waterfront Area Plan emphasizes the importance of industrial and maritime uses over other uses in order to improve the economic base of the city. The overall goal of the Plan is "to create a physical and economic environment conducive to the retention and expansion of San Francisco's industrial and maritime activities ... in order to reverse the pattern of economic decline in the area and to establish a land base for the industrial and maritime components of the San Francisco economy." Objective 1 of the Plan is to "strengthen and expand land use essential to realizing the economic potential of the subareas" and Policy 1 encourages "the intensification and expansion of industrial and maritime uses." There are numerous other policies that call for the retention, expansion, and protection of industrial activity in this area. With this in mind, the development of new residential is not precluded. Objective 6 of the Plan is to "retain and improve existing residential uses and develop a limited quantity of new housing." Therefore, the CCSF's policies imply that industrial uses and residential uses can be compatible providing that the adverse environmental impacts of new development can be adequately mitigated (see Objective 1, Policy 3). The purpose of the staff assessment is to determine if the proposed project's impacts can be mitigated to less-than-significant levels.

The PSA and the FSA acknowledge that the CCSF is currently in the process of preparing a neighborhood plan for the Central Waterfront as part of the Better Neighborhoods Program. As a result of this planning effort, the neighborhood plan may propose changes to the CCSF's land use policies for the Central Waterfront. Unfortunately, we do not know what these proposed changes may be and whether or not they will be adopted by the Board of Supervisors. The CCSF Planning Department

has formulated a preliminary Preferred Concept Plan for the Central Waterfront that proposes to increase the supply of housing in the planning area, but continues to designate the area east of Third Street for industrial uses. At this time, a draft Neighborhood Plan has not yet been prepared and no specific land use policy changes have been proposed. It would be inappropriate and speculative to base any analysis of consistency with local land uses policies on unadopted plans, especially when such plans have not yet even been prepared in draft form. Therefore, we must base our analysis on adopted plans, which constitute the CCSF's official policies, while acknowledging that the CCSF is in the process of updating and possibly revising these policies.

Comments indicating the proposed project would diminish the desirability of the area for other uses or would compromise other CCSF planning efforts present a dilemma. If this is true, it is difficult to understand why the CCSF's land use policies and zoning regulations allow heavy industrial uses in this area, and why the Central Waterfront Area Plan promotes the retention, expansion, and protection of industrial activity in this area. Because the Energy Commission is not in a position to resolve this issue, the PSA and FSA focus on reducing the adverse environmental effects of the proposed project so that, among other things, potential land use incompatibilities are avoided or minimized. As indicated above, issues of potential land use incompatibility are discussed throughout the PSA/FSA. However, we are unable to reach the conclusion that the proposed project is inconsistent with the CCSF's adopted land use policies and regulations.

Although the PSA describes the trend of increased residential development and live/work units in the project vicinity, the discussion of this topic has been expanded in the FSA. The FSA also specifically acknowledges other significant development projects in the general area, including the Mission Bay development to the north (see "Cumulative Impacts" discussion above).

The FSA can only require the applicant to contribute resources to enhance the livability of the affected neighborhoods if a nexus can be established between such a requirement (in the form of a mitigation measure or condition of certification) and a significant impact (or public burden) caused by the project. The mitigation measure or condition must be roughly proportional to the severity of impact caused by the project. Therefore, a significant impact to open space or transportation must be established in order to require the measures suggested in the comment, and the applicant's fair share of the burden would need to be established. Because no significant impacts have been identified related to these topics, the Energy Commission is not able to impose the requested requirements through the FSA.

**CCSF-7B:** *Both CCSF and PG&E are planning transmission additions in the same vicinity during the same general time frame. Coordination of this work is desirable not only to reduce costs and maximize electric reliability, but also to reduce the impacts of construction work on the surrounding community and environment. The PSA encourages the Applicant to pursue "to the extent feasible" shared trenches or other co-location strategies. The PSA requires the Applicant to submit to the Compliance Project Manager (CPM) for review evidence of good faith efforts to co-locate linear facilities. The Applicant should be required to submit this evidence to the CPM for review and*

*approval and serve a copy of the filing on CCSF. To the extent that co-location is not achieved, the PSA requires the Applicant to coordinate with the City regarding construction under Islais Creek. The PSA requires the Applicant to submit to the CPM for review minutes of meetings with City Officials to verify coordination of transmission line boring under Islais Creek. The Applicant should be required to submit the minutes to the CPM for review and approval and serve a copy of the filing on CCSF.*

**Response:** The requested changes have been made to the recommended conditions of certification, **LAND-1** and **LAND-2**.

**CCSF-7C:** *The proposed power plant expansion does not include provision for public access to the open space and shoreline at or in close proximity to the site. Also, the PSA is incomplete in so far as it does not include a review or analysis by the Bay Conservation and Development Commission (BCDC) of the impact of the project on views of the Bay and public access and open space. The CEC should require the Applicant to amend the AFC to include a discussion of the issues and comments and mitigations proposed by BCDC. The McAteer-Petris Act requires that projects within one hundred foot shoreline band must provide "maximum feasible" public access to the Bay. If on site access is not improved because of potential conflict with power plant operations, off site mitigation is essential. CCSF reserves further comment until it has an opportunity to review and analyze the comments and proposed mitigations by BCDC.*

**Response:** Both the Applicant and the Energy Commission staff have been in consultation with BCDC regarding the proposed project's effects on views, shoreline access, and other issues under BCDC's purview. On September 21, 2001, BCDC provided Energy Commission staff with a copy of their comments on the project that were addressed to the BCDC Commissioners, and their requirements for public access. Energy Commission staff has proposed **LAND-3**, **LAND-4**, and **LAND-5** in response to BCDC staff's comments and recommendations. These conditions require the Applicant to increase public access to the Bay, improve Bay Trail conditions along Illinois Street, and to create a new 2.24-acre shoreline park at the eastern end of 23rd Street.

**CCSF-7D:** *The PSA states that the Applicant must secure agreements with the San Francisco Port for the construction of the proposed intake and discharge structures which are partially on Port property, and that the Applicant currently has a lease for the fuel dock and pipeline. However, the PSA does not state that an agreement with the Port is also required for the construction of the transmission line, portions of which would be located on Port property – on Illinois Street, near the proposed Islais Creek crossing and further south on Cargo Way. In addition, the PSA does not indicate that the Applicant has only a month to month lease with the Port for temporary use of the fuel dock and pipeline. The Applicant will be required to have a new agreement with the Port for long-term use of the fuel dock and pipeline. The PSA should be revised to accurately reflect the agreements and approvals required with the San Francisco Port prior to the construction of the proposed project and associated support structures, including the transmission line.*

**Response:** Thank you for the information. The FSA has been updated in the LORS Port Plans section to reflect this information.

**CCSF-10:** *The cumulative impact analysis of commercial and residential development projects does not examine the size and impact of all current and reasonably anticipated projects in Southeast San Francisco. For example, the PSA acknowledges that 20 percent of the City's live/work units are located in the Central Waterfront area and that eighteen additional applications are currently under review, but there is no indication of how many units are proposed for development.*

*Further, this section of the PSA (SOCIOECONOMICS) does not discuss the planning efforts currently underway to increase development along the Central Waterfront. In addition, the cumulative impact analysis does not mention the redevelopment of the Hunters Point Naval Shipyard, the Port's proposed Illinois Street Rail-Truck Bridge, as well as the developments included in the Port's Southern Waterfront Supplemental Environmental Impact Report. This EIR included analysis of a variety of development activities on Port property including the redevelopment of the western portion of Pier 70 and the potential for six new industrial leases. If approved these leases would result in the relocation or expansion of existing uses, as well as the siting of new industrial uses on Port property.*

**Response:** The discussion in the FSA has been expanded to include more information on other significant projects in the area, including the Illinois Street Rail-Truck Bridge, Hunter's Point Naval Shipyard, and Pier 70. (See the description of "Cumulative Impacts" earlier in this section. Port projects are also described in the section entitled "Port Plans" in LORS and "Planned Local Land Use Changes" in Environmental Setting).

**CCSF-11C:** *If the CEC requires post-certification procedures to determine the feasibility of collocation, submission of collocation documents identified in the Land Use section of the PSA should precede submission of the traffic control plan. As currently written, the traffic control plan would be submitted 30 days prior to the commencement of demolition and the collocation documents would thereafter be submitted 30 days prior to the commencement of construction. The Applicant should be required to coordinate with City well in advance of construction so that changes can be adopted if necessary.*

**Response:** Staff agrees that the Applicant should coordinate with the City well in advance of construction. Conditions of certification **LAND-1** and **LAND-2** require that the applicant submit evidence of this coordination 30 days prior to the construction of the subject facilities, but the coordination activity itself would have to take place prior to that. This coordination should take place as early as possible. No collocation documents are required to be submitted by **LAND-1** or **LAND-2**, only evidence of coordination activities. For timing of submission of traffic control plans, please see the Traffic and Transportation section of this FSA.

## **POTRERO POWER PLANT CITIZENS ADVISORY TASK FORCE (PTF)**

**PTF-5:** *Land use developments are not sufficiently addressed. The CEC's PSA characterizes the plant site as "industrial" but does not adequately address current mixed-use planning (e.g., Pier 70 plans and currently approved residential use adjacent to the project). Nor does it address the effect of the project on current efforts to upgrade the Dogpatch neighborhood.*

**Response:** Please see the response to comment CCSF-7A above. The discussion in the FSA has been expanded to include more information on the CCSF's ongoing planning efforts in the area, as well as other significant development projects in the general area.

## **PIER 70 ADVISORY GROUP (P70)**

**P70-4:** *The proposed power plant expansion does not include provision of open space and shoreline public access on-site or in close proximity.*

**Response:** Please see the response to comment CCSF-7C above.

**P70-7A:** *Demolition of the site's historical resources would be inconsistent with the Policies and Objectives of the City's Draft Preservation Element of the General Plan.*

**Response:** Please see the **Cultural Resources** section for a discussion of the site's historical resources. The draft Preservation Element encourages preservation of historic structures. Article 10 of the Planning Code authorizes the Board of Supervisors to designate properties as historical landmarks and to create historical districts. Recommendations for such designations originate with the Landmark Preservation Advisory Board (LPAB) and are acted upon by the Planning Commission. Designation is not complete until ratified by the Board of Supervisors. Once designated as a historical landmark or as part of a historical district, such properties cannot be altered unless a Certificate of Appropriateness is obtained from the Planning Commission, which acts on the advice of the LAPB. The Potrero PP is not designated as a historical landmark.

**P70-7B:** *The proposed Potrero Power Plant expansion project would affect the potential non-industrial recommendations from the Better Neighborhoods 2002 Land Use Study and would be in conflict with the recent development of live/work spaces that strengthen the residential aspects of the area and create additional demand for residential amenities and neighborhood services.*

*The historical industrial character of the Central Waterfront is changing to a mixture of industrial, commercial and residential/live-work uses. The analysis of the proposed power plant expansion project impacts should recognize diversity of uses in the area, especially the residential aspects of existing live-work developments in the immediate vicinity.*

**Response:** Please see the response to comment CCSF-7A above. The discussion of land use changes in the Central Waterfront, including the increased number of residential units in the area, has been expanded in the FSA.

**P70-7C:** *Expansion of the power plant may discourage development of housing in the Southern Waterfront and generate additional demand for housing in the City.*

**Response:** Please see the response to comment CCSF-7A above. CEC staff does not know whether the expansion of the plant would or would not discourage new housing development in the area. Since the immediate area consists primarily of industrial

development and the project site has been in use as a power-generating facility for a very long time, the proposed project would not substantially alter the existing industrial character of the site or the immediate surrounding area. Decisions by housing developers as to whether or not to undertake new projects in this area will continue to be influenced by these circumstances. Consideration of whether heavy industrial development should continue to be permitted in this area, as well as the degree to which residential development should be allowed to encroach upon the area, is a policy matter to be resolved by the CCSF.

The CCSF's current land use policies and zoning regulations allow heavy industrial uses in this area, and the Central Waterfront Area Plan promotes the retention, expansion, and protection of industrial activity in this area. The CCSF's existing land use policies and regulations also allow residential uses in this area. Because the CEC is not in a position to resolve this issue, the PSA and FSA focus on reducing the adverse environmental effects of the proposed project so that, among other things, potential land use incompatibilities are avoided or minimized.

## **COMMUNITIES FOR A BETTER ENVIRONMENT (CBE)**

**CBE-18A:** *The Land Use and Socioeconomics sections of the PSA bear very little relation to the actual setting of the Potrero power plant and its expansion project. The PSA does not acknowledge the existence of the southeast section of San Francisco as an area with demographic and environmental characteristics that are quite distinct from other parts of San Francisco, although residents of San Francisco recognize this fact quite readily. As a result, the impacts of the project are either missed, ignored, or downplayed to the point of invisibility.*

**Response:** Please see the response to comment CCSF-7A above. The discussion of land use changes in the Central Waterfront, including the increased number of residential units in the area, has been expanded in the FSA. The **Socioeconomics** sections of both the PSA and FSA describe the demographic characteristics of the project area.

**CBE-18B:** *Much relevant information is missing from both sections. It is difficult to understand how the huge Mission Bay development, to the north of the project site, and the huge Hunters Point Naval Shipyard Superfund clean-up and redevelopment project, to the south, could have been ignored in these sections. Many smaller projects also go without mention. Indeed, there is not effort in the PSA to identify all projects and land use issues even within the limited one-mile radius of the project site that appears to have been used. Land Use-Figure 1 and Land Use-Figure 2 maps even manage to miss the existing Hunters Point Power Plant, which should be shown on them because it falls within 440 yards of the utility route.*

*The lack of recognition of the explosion of residential uses in the vicinity of the project is striking. No mention is made of a Fall 1997 Concept Plan by the San Francisco Planning and Urban Research Association (SPUR) for redevelopment of the Central Waterfront. The concept plan concluded the area could accommodate 10,000 new homes and up to 2,000 live work units. Nor is the recent rapid approval of new residential and commercial development by the Planning Commission and Board of*



*Permits considered. According to the San Francisco Planning Department, since 1990 more than 1,400 lofts have been built in San Francisco. As of April 1999, Dogpatch (within 400 yards of the Potrero power plant) alone had 813 live/work projects either proposed or under construction. The Port of San Francisco's Pier 70 project, which includes office space, artist studios, public plaza, small business incubators, restaurants will be within three blocks of the proposed expansion project.*

**Response:** The FSA lists other significant development projects in the general area, including the Mission Bay development and the Port's Pier 70 project (see "Cumulative Impacts" discussion above). **LAND USE Table 2** and **LAND USE Figure 4** have been added to show proposed, recently built, and other related projects in the vicinity of the Potrero PP. The Hunters Point Power Plant has been included in **LAND USE Figure 4**. Although the PSA describes the trend of increased residential development and live/work units in the project vicinity, the discussion of this topic has been expanded in the FSA. More relevant than the SPUR Concept Plan is the Central Waterfront Neighborhood Plan currently under development by the CCSF Planning Department. The CCSF Planning Department hopes to formulate a new land use plan for the area that would allow the construction of up to 2,000 new housing units in the Central Waterfront. In the Preferred Concept Plan introduced at a workshop in September 2001, the areas east of Third Street would remain industrial; however, new housing would be mixed with light industrial uses in certain areas west of Third Street.

**CBE-18C:** *Some of the information that is provided in the PSA is simply incorrect. Much to the surprise of everyone who lives in the area, the PSA states "there is no concentration of minority or low-income populations immediately adjacent" to the project. Within 1300 yards there are three schools and 1000 young schoolchildren of color. The two closest schools are elementary schools and the third is a middle school. Mirant's responses to data requests from the Potrero Boosters Neighborhood Association concluded that there are indeed concentrations of minority and low-income populations adjacent to the project. Over 90% of the 1000 students are children of color and over 90% of the children participate in the federal free lunch program.*

**Response:** The statement in the PSA only referred to immediately adjacent uses; however, we agree that this statement can be misconstrued. Therefore, the discussion of effects on minority and low-income populations has been revised in the FSA. Both the PSA and FSA clearly acknowledge that both minority and low-income populations exist in the vicinity of the Potrero PP site.

## **SAN FRANCISCO BAY CONSERVATION AND DEVELOPMENT COMMISSION (BCDC)**

**BCDC-13:** *The Land Use section of the PSA/FSA should specifically cite the sections in the McAteer-Petris Act and the San Francisco Bay Plan that apply to this project. In addition, the explanation of BCDC's role in the PSA states that public access to the Bay must be provided for project within the 100-foot shoreline band. However, the law requiring maximum feasible public access applies to projects in the Bay and the shoreline band. Section 66602 of the McAteeris-Petris Act states, in part, that: "...existing public access to the shoreline and waters of the San Francisco Bay is inadequate and that maximum feasible public access, consistent with a proposed*

*project, should be provided.” Section 66632 states, in part, that “[w]hen considering whether a project provides maximum feasible public access in areas of sensitive habitat, including tidal marshlands and mudflats, the Commission shall, after consultation with the Department of Fish and Game, and using the best available scientific evidence, determine whether the access is compatible with wildlife protection in the Bay.” The San Francisco Bay Plan policies on public access further state that “...maximum feasible public access should be provided in and through every new development in the Bay or on the shoreline...the access should be permanently guaranteed...should be consistent with physical environment...provide for the public’s safety and convenience...and built to encourage diverse Bay related activities and movement to and along the shoreline...”*

**Response:** Thank you for the information. The FSA has been revised accordingly, in the LORS section under Bay Conservation and Development Commission.

**BCDC-14:** *Finally, the Land Use section describes the need, on a project by project basis, for providing mitigation for Bay fill. While mitigation for any adverse impacts of fill in the Bay may be required by the Bay Commission, public access would not be an appropriate mitigation for Bay fill. The Bay fill mitigation should be addressed in the sections on Soil and Water Resources and Aquatic Biological Resources and should provide direct mitigation for adverse impacts of Bay fill. Should the Bay Commission determine that the project provides maximum feasible public access to the Bay, the determination would be based on Section 66632 of the McAteer-Petris Act and the Bay Plan policies on public access rather than as mitigation.*

**Response:** Thank you for the information. The FSA has been revised accordingly.

## **ALLISON SHORE (AS)**

**AS-1:** *Alternatives – Need to consider future projected growth within 2 miles of the plant using a 40 year, longitudinal analysis, with planned growth.*

**Response:** For the purposes of this staff assessment, future growth is considered in two ways. The first is planned, proposed, or recently built projects in the vicinity of the project site. Such projects are described in the preceding “Cumulative Impacts” section. The second way that future growth is considered is through an examination of the CCSF’s long-range land use policies as set forth in the San Francisco General Plan and Central Waterfront Area Plan. These policies are discussed in the preceding section entitled “Compliance With Laws, Ordinances, Regulations and Standards.”

## **MICHAEL STRAUSS & COMPANY, INC. (MSC)**

**MSC-1:** *New information which the staff and the Commissioners would likely not have that shows what real damage the permitting of the Potrero expansion plant would cause to the City by the loss of the Central Waterfront’s housing potential.*

**Response:** Thank you for the information. Staff has been in contact with the CCSF Planning Department regarding the status of the permanent IPZ Special Use District and the Central Waterfront neighborhood planning effort. Please see the response to

comment CCSF-7A above and the earlier section entitled “Interim and Advance Planning” that discusses both the IPZ Special Use District and the Central Waterfront Neighborhood Plan.

**MSC-2:** *Expanding the power plant will blight the Central Waterfront and stifle or completely prevent housing development there. If approved, Mirant should pay San Francisco a land use mitigation fee of \$300 million per year.*

**Response:** Please see the response to comment P70-7C above. Please note that the Potrero PP is a permitted use according the San Francisco General Plan and zoning ordinance. A land use mitigation fee cannot be imposed for the project’s possible influence on future land development decisions in the future. If the project were not consistent with the CCSF’s land use policies and regulations, changes would be required to achieve consistency or else the project would not proceed.

**MSC-3:** *The zoning allows for a “steam power plant.” This plant is a combined cycle plant, with a steam component (which doesn’t run without the combustion turbines producing heat). Every expert in the energy business I spoke with said that no one would ever call the applicant’s proposed plant a “steam power plant.” The combustion plants already there are a non-conforming use and cannot be used as evidence for a further non-conforming application.*

**Response:** Please see the discussion under “San Francisco Planning Code (Zoning Ordinance)” in the preceding Assessment of Impacts section. In a letter dated August 8, 2001, the CCSF Zoning Administrator determined that the type of power plant proposed by the Applicant is permitted in the M-2 district. The Zoning Administrator further stated that other types of power plants would also be permitted in the M-2 district because the “steam “ reference is outdated due to the fact this Code section has not been updated in many years.

**MSC-4:** *The area in around the power plant is presently (and since 8/99, 8 months prior to Mirant’s application) zoned New Mixed Use, wherein housing development is encouraged over the underlying M-2 zoning. By Mirant’s own words found in the Alternate Use section, they would had to have determined that a new power plant on the Potrero site would be incompatible with the present and proposed uses.*

**Response:** The current zoning at the site is M-2, as indicated, and the CCSF’s zoning regulations allow the development of new residential units in this zone. The exceptions are areas included within the boundaries of the CCSF’s recently adopted IPZ Special Use District. The Potrero PP is not located with the boundaries of the IPZ Special Use District; so new residential units are permitted. The Mixed Use zone was an interim designation that is no longer in effect.

**MSC-5:** *The Potrero Central Waterfront is presently undergoing a Better Neighborhoods planning process, which calls for upgrading the neighborhood, including encouraging building of up to 3000 residential units along the 3<sup>rd</sup> Street corridor.*

**Response:** The CCSF’s current neighborhood planning effort for the Central Waterfront is described under the heading “Interim and Advance Planning” in the preceding LORS section. The most recent Preferred Concept Plan for the Central

Waterfront (presented at a September 2001 public workshop) proposes to allow the construction of up to 2,000 new housing units in the Central Waterfront to help meet the high demand for housing in the city.

## **FORM LETTERS TO THE COMMITTEE (FL)**

**FL-1A:** *...southeast San Francisco already has two power plants, two freeways, city sewage plant, industrial pollution and large volume of truck traffic.*

**Response:** Staff is aware of the existing power plants, freeways, sewage plant, and industrial facilities in southeast San Francisco. Please see the **Air Quality, Public Health, and Traffic and Transportation** sections of the FSA for discussions of the additional impacts that the proposed Potrero PP Unit 7 would contribute to southeast San Francisco.

**FL-1B:** *"The proposed expansion...would be too close to children and schools" and "...a dense residential area across the street from the plant."*

**Response:** Staff is aware of the residential areas and schools in the vicinity of the project site and the potential incompatibilities that may exist between the proposed Potrero PP Unit project and the nearby residences and schools. Please see the **Air Quality, Public Health, and Noise** sections of the FSA for discussions of the potential impacts that the proposed Potrero PP Unit 7 project would have on sensitive land uses, including residential areas and schools.

## **MICHAEL ALEXANDER – RESIDENT AND MEMBER OF “SAN FRANCISCO BEAUTIFUL” (MA)**

**MA-1:** *Bay Trail – Need to provide for Bayside Trail as an alternative to Illinois Street which is where truck traffic will conflict with trail users.*

**Response:** Please see the response to comment CCSF-7C above. Condition of Certification **LAND-3** would require the project owner to provide future public access along the shoreline in addition to Bay Trail improvements on Illinois Street.

## **KIM ROOKER (KR)**

**KR-1:** *Plant Location – Why is a new (larger) power plant being proposed in an area that will become residential in the future? The waterfront area is more valuable to the city as residential. Property values will be affected.*

**Response:** The CCSF has not yet made any decision to designate the Potrero PP site or adjacent properties for residential use instead of industrial use. However, staff is aware that the CCSF has allowed residential uses to encroach into industrial areas and that proposals are under consideration to change land use designations in the Central Waterfront area to allow more residential uses in the future. At this time, the Potrero PP site and surrounding properties are still zoned for industrial uses. In the CCSF Planning Department's Preferred Concept for the Central Waterfront Neighborhood Plan, the area east of Third Street would continue to be designated for industrial uses. Please see the response to comment CCSF-7A above.

## CONCLUSIONS AND RECOMMENDATION

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### CONCLUSIONS

The project will comply with all applicable land use laws, ordinances, regulations and standards (LORS). The proposed building and exhaust stacks will exceed the CCSF's height limitations on structures in the Central Waterfront; however, these are exempt "structures and equipment necessary for the operation of industrial plants" as long as they do not contain separate floors (San Francisco Planning Code Section 260(b)(2)(M)).

The proposed power plant will be compatible with existing and planned land uses because: 1) it is consistent with the current general plan and zoning designations for the property; 2) it is compatible with the heavy industry and port character of the immediately adjacent land uses north and south of the site, and with the commercial character of the land use on Illinois Street; and 3) the project does not abut any zoned residential areas. However, live/work units proposed at the southwest corner of 23rd and Illinois Streets, within the M-2 Heavy Industry zone, would be within approximately 500 feet of the project.

Based on information collected during the course of this analysis, Staff has determined that the proposed Potrero PP Unit 7 project would not result in any unmitigated disproportionate land use impacts to a minority or low-income population.

Staff has concluded that the proposed project has the potential to cause some cumulative impacts in the land use area. Specifically, during the project construction phase, there is a potential for conflict with a planned MUNI project, and the CCSF's planned Illinois Street Rail-Truck Bridge. These potential impacts can be mitigated to a level of less than significant through adoption of staff's proposed conditions.

### RECOMMENDATION

From the land use perspective, staff recommends that the Commission certify the project and adopt the following conditions of certification, which incorporate staff's proposed mitigation.

### CONDITIONS OF CERTIFICATION

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**LAND-1** The project owner will coordinate installation of underground transmission facilities with MUNI's development of underground facilities for the Third Street Light Rail development, to the extent that this is technically feasible and can be accommodated by the schedule of both projects. To the extent feasible, shared trenches or other co-location strategies shall be pursued so as to minimize disruption to local traffic.

**Verification:** At least 30 days prior to the start of construction of the underground transmission facilities, the project owner shall submit to the Energy Commission's Compliance Project Manager (CPM) for review minutes of meetings with MUNI and other City/County officials to verify good faith efforts to co-locate linear electric facilities

development. If there is no agreement, the project owner shall provide the CPM a letter report outlining the reasons an agreement was not achieved and detailing the nature of barriers that remain to an agreement.

**LAND-2** To avoid location and construction conflicts, the project owner will coordinate with the City/County regarding the planned transmission line boring under Islais Creek relative to the location of footings or pilings for the City/County's planned Illinois Street Rail-Truck Bridge in the same vicinity. This Condition applies only if the proposed transmission line route remains under Islais Creek in the vicinity of the proposed bridge.

**Verification:** At least 30 days prior to transmission line boring at Islais Creek, the project owner shall submit to the Energy Commission's CPM for review minutes of meetings with City officials and any pertinent drawings or plans to verify coordination of transmission line boring and bridge construction at the Islais Creek crossing.

**LAND-3** Consistent with the October 4, 2001, BCDC approval of the "Staff Recommendation on the Commission's Report to the California Energy Commission on the Potrero Power Plant Expansion", the project owner shall, at such a time that public access becomes available north of the site, and at such a time when changes in the location and/or operation of the Unit 3 Potrero facilities would accommodate safe access, install an adequate pathway along the shoreline of the property that connects the new public access south of the project site, between 23<sup>rd</sup> Street and the Bay (see **LAND-5**), to the available future access route to the north. The purpose of the future shoreline path would be to provide unrestricted public bayside access for walking, biking, viewing and related activities.

**Verification:** At least 30 days prior to the start of construction of the Potrero PP Unit 7, the project owner shall submit to the Energy Commission's CPM for review a public access guarantee for the future shoreline path, along with precise design specifications of the future path, as specified by the October 4, 2001, BCDC approval of the "Staff Recommendation on the Commission's Report to the California Energy Commission on the Potrero Power Plant Expansion". At such a time, the BCDC shall be given the opportunity to review and comment on the documents submitted to the Energy Commission's CPM.

**LAND-4** Consistent with the October 4, 2001, BCDC approval of the "Staff Recommendation on the Commission's Report to the California Energy Commission on the Potrero Power Plant Expansion", the project owner shall work with the Energy Commission, BCDC, City and County of San Francisco, MUNI, ABAG, Bay Trail personnel, and PG&E to determine the scope of the public improvements that will be required along the Illinois Street Bay Trail Segment, and develop a plan for installing those improvements. At a minimum those plans shall include (along the width of the project site) landscaping, Bay Trail signs, and bike lanes on both sides of the street. If bike lanes are not deemed feasible, the project owner shall contribute money to the BCDC's access fund in an amount that approximates the cost of the bike lane improvements, as assessed by a licensed contractor.

Protocol: The project owner shall consult with the Energy Commission, BCDC, City and County of San Francisco, MUNI, ABAG, Bay Trail personnel, and PG&E on the nature, extent, and design of public improvements for the Illinois Street Bay Trail Segment. The project owner shall then submit draft design plans for the public improvements to the CPM, BCDC, City and County of San Francisco, MUNI, ABAG, Bay Trail personnel, and PG&E for review and comment. The project owner shall revise the design plans based on comments received and prepare final design plans for submittal the CPM. The project owner shall also provide the CPM with copies of comments made by other reviewers on the draft design plans and indicate how the comments were addressed in the revised design.

**Verification:** At least 30 days prior to the start of construction of the Potrero PP Unit 7, the project owner shall submit to the Energy Commission's CPM for approval final precise site, architectural and landscaping plans and any other relevant material for the necessary improvements of the Illinois Street Bay Trail segment, as specified by the October 4, 2001, BCDC approval of the "Staff Recommendation on the Commission's Report to the California Energy Commission on the Potrero Power Plant Expansion". Prior to the commercial operation of the Potrero PP Unit 7, the project owner shall notify the CPM that the Illinois Street Bay Trail improvements have been installed and that the facilities are ready for inspection.

**LAND-5** Consistent with the October 4, 2001, BCDC approval of the "Staff Recommendation on the Commission's Report to the California Energy Commission on the Potrero Power Plant Expansion", the project owner shall make available, exclusively to the public on an unrestricted basis, a 2.24-acre shoreline park and linear park area at the eastern end of 23<sup>rd</sup> Street for the purpose of public walking, bicycling, viewing and related recreational activities. The project owner shall be responsible for the installation of the following improvements in the shoreline park and linear park:

- A minimum 10-foot-wide, all weather path connecting 23<sup>rd</sup> Street to the shoreline park;
- Irrigated landscaping throughout the linear park and the shoreline park, including effective screening between the power plant and the parks;
- An attractive gate on 23<sup>rd</sup> Street that will remain open during daylight hours;
- Public amenities throughout the parks, including benches, table(s), trash receptacles, and possible reuse of the existing pump house structure;
- Attractive lighting throughout the park to maintain security even when the park is closed after daylight hours; and
- Public access and Bay Trail signs where appropriate.

The areas and improvements within the 2.24-acre park area shall be permanently maintained by and the expense of the project owner or its assignee(s).

Protocol: The project owner shall consult with the Energy Commission, BCDC, City and County of San Francisco, Bay Trail personnel, and the Port of San Francisco on the nature, extent, and design of improvements for the

shoreline park and linear park. The project owner shall then submit draft design plans for the park improvements to the CPM, BCDC, City and County of San Francisco, Bay Trail personnel, and the Port for review and comment. The project owner shall revise the design plans based on comments received and prepare final design plans for submittal the CPM. The project owner shall also provide the CPM with copies of comments made by other reviewers on the draft design plans and indicate how the comments were addressed in the revised design.

**Verification:** At least 30 days prior to the start of construction of the Potrero PP Unit 7, the project owner shall, by instrument acceptable to the CPM, guarantee rights for the public to access the new 2.24-acre public facility, as specified by the October 4, 2001, BCDC approval of the “Staff Recommendation on the Commission’s Report to the California Energy Commission on the Potrero Power Plant Expansion”.

At least 30 days prior to the start of construction of the Potrero PP Unit 7, the project owner shall submit to the Energy Commission's CPM for approval final precise site, architectural and landscaping plans and any other relevant material for the improvements for the shoreline park and linear park. Prior to the commercial operation of the Potrero PP Unit 7, the project owner shall notify the CPM that the park improvements have been installed and that the facilities are ready for inspection.

## REFERENCES

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Port of San Francisco. 2000. Waterfront Land Use Plan, January 2000.

San Francisco General Plan, 1996 (as amended).

San Francisco Planning Department. 2000. Southern Waterfront Supplemental Draft Environmental Impact Report, September 2000.

San Francisco Planning Department. 2001. Central Waterfront Preferred Concept and Alternatives (maps only). Provided by Jasper Rubin of the San Francisco Planning Department in January 2002.

San Francisco Zoning Administrator. 2001. Letter in response to a request for written determination pursuant to Planning Code § 307(a). August 8.

Southern Company (Mirant Corp.). 2000a. Application for Certification for Potrero Power Plant Unit 7 Project, May 2000.

Southern Company (Mirant Corp.). 2000b. Supplemental Information in Response to CEC Data Adequacy Request. August 2000.



# NOISE

Testimony of Jim Buntin

## INTRODUCTION

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The construction and operation of any power plant creates noise, or unwanted sound. The character and loudness of this noise, the times of day or night during which it is produced, and the proximity of the facility to any sensitive receptors combine to determine whether the facility will meet applicable noise control laws and ordinances, and whether it will exhibit significant adverse environmental impacts.

The purpose of this analysis is to identify and examine the likely noise impacts from the proposed Potrero Power Plant Unit 7 Project (Unit 7), and to recommend procedures to ensure that the resulting noise impacts will comply with applicable laws and ordinances, and will be adequately mitigated. This will enable the Energy Commission to make findings that:

- Unit 7 will likely be built and operated in compliance with all applicable noise laws, ordinances, regulations and standards (LORS); and
- Unit 7 will present no significant adverse noise impacts, or none that have not been mitigated to the extent feasible.

## LAWS, ORDINANCES, REGULATIONS AND STANDARDS

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### FEDERAL

Under the Occupational Safety and Health Act of 1970 (OSHA) (29 U.S.C. § 651 et seq.), the Department of Labor, Occupational Safety and Health Administration (OSHA) has adopted regulations (29 C.F.R. § 1910.95) designed to protect workers against the effects of occupational noise exposure. These regulations list permissible noise level exposure as a function of the amount of time during which the worker is exposed (see **Noise: Appendix A, Table A4** immediately following this section). The regulations further specify a hearing conservation program that involves monitoring the noise to which workers are exposed; assuring that workers are made aware of overexposure to noise; and periodically testing the workers' hearing to detect any degradation.

There are no federal laws governing offsite (community) noise.

### STATE

California Government Code Section 65302(f) requires that a noise element be prepared as part of the general plan to address foreseeable noise problems. In addition, Title 4, California Code of Regulations has guidelines for evaluating the compatibility of various land uses as a function of community noise exposure. The State land use compatibility guidelines are listed in NOISE: Table 1.

## NOISE: Table 1 Land Use Compatibility for Community Noise Environment

LAND USE CATEGORY		COMMUNITY NOISE EXPOSURE - Ldn or CNEL (dB)							
		50	55	60	65	70	75	80	
Residential - Low Density Single Family, Duplex, Mobile Home									
Residential - Multi-Family									
Transient Lodging - Motel, Hotel									
Schools, Libraries, Churches, Hospitals, Nursing Homes									
Auditorium, Concert Hall, Amphitheaters									
Sports Arena, Outdoor Spectator Sports									
Playgrounds, Neighborhood Parks									
Golf Courses, Riding Stables, Water Recreation, Cemeteries									
Office Buildings, Business Commercial and Professional									
Industrial, Manufacturing, Utilities, Agriculture									

	<b>Normally Acceptable</b>	Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements.
	<b>Conditionally Acceptable</b>	New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features are included in the design.
	<b>Normally Unacceptable</b>	New construction or development should be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirement must be made and needed noise insulation features included in the design.
	<b>Clearly Unacceptable</b>	New construction or development generally should not be undertaken.

Source: State of California General Plan Guidelines, Office of Planning and Research, June 1990.

Other State LORS include the California Environmental Quality Act (CEQA) and California Occupational Safety and Health Administration (Cal-OSHA) regulations.

### **California Environmental Quality Act**

CEQA requires that significant environmental impacts be identified, and that such impacts be eliminated or mitigated to the extent feasible. The CEQA Guidelines (Cal. Code of Regulations, Title 14, § 15000 et seq., Appendix G, § XI) explain that a significant effect from noise may exist if a project would result in:

- “a) Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies.
- “b) Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels.
- “c) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project.
- “d) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project....”

The Energy Commission staff, in applying Item c) above to the analysis of this and other projects, has concluded that a potential for a significant noise impact exists where the noise of the project plus the background exceeds the background by 5 dBA L<sub>90</sub> or more at the nearest noise sensitive receptor.

Noise due to construction activities is usually considered to be insignificant in terms of CEQA compliance if:

1. The construction activity is temporary,
2. Use of heavy equipment and noisy activities is limited to daytime hours, and
3. All feasible noise abatement measures are implemented for noise-producing equipment.

### **Cal-OSHA**

Cal-OSHA has promulgated Occupational Noise Exposure Regulations (Cal. Code Regs., tit. 8, §§ 5095-5099) that set employee noise exposure limits. These standards are equivalent to the federal OSHA standards described above.

## **LOCAL**

### **City and County of San Francisco General Plan Noise Standards**

The Noise Element of the City and County of San Francisco General Plan pertains only to transportation-related noise, so there are no specific provisions in the General Plan addressing noise due to fixed sources such as the Unit 7.

### **City and County of San Francisco Noise Ordinances**

The City and County of San Francisco has adopted a Noise Ordinance that regulates fixed noise sources and construction. Section 2909 of the San Francisco Municipal

Code regulates noise from fixed sources, and is enforced by the Director of Public Health. The basic noise level criteria for most residential land uses (zoned R-1-D, R-1 and R-2) are that the average noise level caused by the source shall not exceed 50 dBA at nighttime (10 p.m. to 7 a.m.), or 55 dBA in daytime (7 a.m. to 10 p.m.), measured at the affected property line. The noise standard for industrial-zoned land (M-1) is 70 dBA anytime. In the absence of specific noise standards, Section 2901.11 states that producing a noise level that exceeds the ambient noise level by 5 dBA or more when measured at the receiving property line is a violation of the Code.

Sections 2907 and 2908 of the San Francisco Municipal Code regulate noise from construction sources, and are enforced by the Director of Public Works. The basic requirement for individual articles of construction equipment is that the noise level shall not exceed 80 dBA at a distance of 100 feet, except for impact tools and equipment such as jackhammers and pile drivers, and except for helicopters used in construction.

Nighttime construction is limited by Section 2908. It states that it is unlawful, between the hours of 8 p.m. and 7 a.m., to erect, construct, demolish, excavate for, alter or repair any building or structure if the noise level thereby created exceeds the ambient noise level by 5 dBA or more. Exceptions may be granted by the Director of Public Works in the form of a special permit prescribing such conditions, working times, equipment types and noise standards as deemed to be required in the public interest.

## **SETTING**

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### **PROJECT BACKGROUND**

The Unit 7 Project involves the construction and operation of a new 530 MW natural gas-fired, combined-cycle power plant, located in the City and County of San Francisco. The new unit will include two natural gas fired General Electric Frame 7FA combustion turbine generators (CTGs), one steam turbine generator and associated equipment. It will also include two supplementally fired heat recovery steam generators (HRSGs). Step up transformers, power transmission system, control buildings, storage tanks and other ancillary equipment will complete the facility.

The existing Potrero Power Plant is located in a waterfront industrial area, and is immediately surrounded by industrial uses to the south, west and north. The San Francisco Bay is at the east project boundary. The new Unit 7 will be an addition to the site's existing Units 3, 4, 5 and 6.

The City and County of San Francisco regulates land use planning for the Potrero Power Plant site.

The Potrero Power Plant site, zoned for Heavy Industry, is authorized under the City and County of San Francisco General Plan land use designation as HI (Heavy Industry) (SECAL 2000a, AFC Figure 8.4.2).

The nearest sensitive receptors are multi-family residences located nearby at Third Street near 22<sup>nd</sup> Street, 22<sup>nd</sup> Street west of Third Street, and in the Potrero Hill

neighborhood west of Interstate 280. With the exception of the Potrero Hill neighborhood, multi-story industrial buildings block line of sight to the facility from the residences.

## **EXISTING NOISE LEVELS**

In order to predict the likely noise effects of the Unit 7 on these sensitive receptors, the Applicant commissioned an ambient noise survey of the area. This survey was performed using Larson Davis Model 712 integrating sound level meters, which recorded  $L_{eq}$ ,  $L_{10}$ ,  $L_{50}$ , and  $L_{90}$  noise measurements (SECAL 2000a, AFC § 8.5.1.1). The daily  $L_{dn}$  and CNEL values were calculated by staff from the hourly  $L_{eq}$  data.<sup>1</sup>

The Applicant's noise survey monitored noise levels at the nearest residence with a direct line of sight to the plant, which is located about 1,200 feet from the proposed facility (Site ML1). Noise measurements were recorded hourly for a 25-hour period from 9:00 a.m. on October 11, 1999, until 10:00 a.m. October 12, 1999.

In addition to noise measurements at the nearest affected residence, noise measurements were recorded at three other locations (Sites ML2, ML3 and ML4) for a one-hour period during the daytime, evening and nighttime periods to further characterize the existing noise levels in the vicinity of the site. The noise levels in those time periods were measured at all three sites on August 18 and 19, 1999, and at two sites on October 11 and 12, 1999.

Survey results indicated that the ambient noise level for the most affected residential receptor is primarily affected by vehicular traffic. The average noise levels over the 25-hour period were 64.9 dBA  $L_{eq}$ , 68.2 dB  $L_{dn}$ , 55.9 dBA  $L_{90}$ , and 68.5 dB CNEL. The average noise levels at the three short-term noise measurement sites were in the range of 60 to 65 dBA  $L_{eq}$  at ML2, 54 to 62 dBA  $L_{eq}$  at ML3, and 50 to 59 dBA  $L_{eq}$  at ML4. The existing power plant was noted to be audible at ML2, which is located near the project boundary. The apparent power plant noise level there was about 47 dBA. (Unit 7 2000, AFC Tables 8.5.1, 8.5.2, and 8.5.3).

## **ANALYSIS OF IMPACTS**

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Project noise impacts can be created by construction and by normal operation of the power plant.

### **PROJECT SPECIFIC IMPACTS — CONSTRUCTION**

Construction noise is a temporary phenomenon; the construction period for the Unit 7 facility is scheduled to last 24 months (SECAL 2000a, AFC § 2.2.14.3). Construction of an industrial facility such as a power plant is typically and unavoidably noisier than what is usually permissible under noise ordinances regulating fixed sources. In order to allow the construction of new facilities, construction noise during certain hours is commonly exempt from enforcement by local ordinances. Refer to the aforementioned section on LORS associated with the City and County of San Francisco.

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<sup>1</sup> For definitions of these and other technical terms, please refer to NOISE: APPENDIX A, immediately following this section.

The Applicant has predicted the noise impacts of project construction at the nearest sensitive receptors. When construction activities occur, resulting noise levels at the nearest residence are projected to be less than 50 dBA. Average ambient noise levels there were reported to be in the range of 50 to 59 dBA. Therefore, construction related noise levels would be considered minor and will not result in any noise impacts (SECAL 2000a, AFC § 8.5-5).

## **Steam Blows**

Typically, the steam blows create the loudest noise encountered during construction, and are inherent in building any project incorporating a steam turbine. After erection and assembly of the feedwater and steam systems, the piping and tubing that comprises the steam path has accumulated dirt, rust, scale and construction debris such as weld spatter, dropped welding rods and the like. If the plant were started up without thoroughly cleaning out these systems, all this debris would find its way into the steam turbine, quickly destroying the machine.

In order to prevent this, before the steam system is connected to the turbine, the steam line is temporarily routed to the atmosphere. High-pressure steam is then raised in the heat recovery steam generator (HRSG) or a temporary boiler and allowed to escape to the atmosphere through the steam piping. This flushing action, referred to as a steam blow, is quite effective at cleaning out the steam system. A series of short steam blows, lasting two or three minutes each, is performed several times daily over a period of two or three weeks. At the end of this procedure, the steam line is connected to the steam turbine, which is then ready for operation.

These steam blows can produce noise as loud as 130 dBA at a distance of 100 feet. This would attenuate to approximately 108 dBA, an exceedingly disturbing level, at the nearest residence, 1,200 feet distant. In order to minimize disturbance from steam blows, the steam blow piping can be equipped with a silencer that will reduce noise levels by 20 to 30 dBA, or to a level of 78 to 88 dBA at the nearest residence. This is still an annoying noise level; staff proposes (see proposed Condition of Certification NOISE-4) that the Applicant be required to employ a quieter low-pressure steam blow process, variously referred to as QuietBlow™ or Silentsteam™. This method utilizes lower pressure steam over a continuous period of approximately 36 hours. Resulting noise levels reach only about 80 dBA at 100 feet; noise levels at the nearest residence would thus be about 58 dBA, in the range of the background noise levels.

In addition, staff proposes a notification process (see proposed Condition of Certification **NOISE-5** below) to make neighbors aware of impending steam blows. This will ensure that noise due to the process will be acceptable to the nearest residents.

## **Linear Facilities**

The interconnection between the Potrero switchyard and PG&E's Hunters Point Substation will consist of two 115 kV circuits, composed of 3-phase cables that will be installed in twin parallel underground conduits. After leaving the Potrero switchyard, the underground cables will be routed under city streets between the two substations. The preferred routing lies primarily within Illinois Street-Cargo Way.

Construction of the transmission cables will produce noise. This noise will be noticeable, and possibly annoying, to persons outside their homes at those residences nearest the construction area. This work, however, is only a temporary phenomenon; the work will progress at such a pace that no single receptor will be inconvenienced for more than a few days. In addition, such work is customarily performed during the daytime, and would cause no impacts at night, when quiet time is most important. Applicable LORS (i.e., City and County of San Francisco Municipal Code Sections 2907 and 2908), regarding daytime and nighttime construction noise, limit noisy construction hours and noise levels.

Transmission line construction will be adjacent to industrial and commercial land uses. Staff believes no significant adverse noise impacts are likely to occur due to the construction of the linear facilities.

### **Worker Effects**

The Applicant acknowledges the need to protect construction workers from noise hazards as well as the existence of applicable LORS relating to worker health and safety. In order to comply with any applicable LORS, the project owner will conduct an occupational noise evaluation that will identify the activity, associated noise levels, and the type(s) of administrative and engineering controls to serve as mitigation. Measures to be implemented for noise-related impacts may include a Hearing Conservation Program and a Personal Protective Equipment Program.

To ensure adequate protection of workers, staff proposes a Condition of Certification (see Condition of Certification **NOISE-3**).

## **PROJECT SPECIFIC IMPACTS — OPERATION**

The Applicant commits to incorporating noise mitigation measures into the design of the project that will ensure that noise levels at the nearest receptor (about 1,200 feet in distance) will be below the 50 dBA standard established by the City and County of San Francisco. The noise impact calculations in the AFC indicate that the normal operating noise level from the proposed power plant would be approximately 55 dB CNEL at the closest residential receptor, which is well below the ambient survey level of 68.5 dB CNEL.

### **Power Plant Operation**

During its operating life, Unit 7 will represent essentially a steady, continuous noise source day and night. Occasional short-term increases in noise level will occur as steam relief valves open to vent pressure, or during startup or shutdown as the plant transitions to and from steady-state operation. At other times, such as when the plant is shut down for lack of dispatch or for maintenance, noise levels will decrease.

The primary noise sources anticipated from the proposed facility include the heat recovery steam generators, the combustion turbine generator packages, and the steam turbine generator. The noise emitted by power plants during normal operations is generally broadband, steady state in nature.

The Energy Commission defines the area impacted by the proposed project as that area where there is a potential increase in existing noise levels of 5 dBA or more during operation of the project. Typically, the Energy Commission requires that the 5 dBA change be compared against the lowest one-hour  $L_{90}$  (background) values, which usually occur during nighttime hours where sleep interference is an issue. According to Table 8.5-2 of the Applicant's AFC, the lowest  $L_{90}$  noise level of 47.4 dBA occurred at ML1 between the hours of 3:00 a.m. and 4:00 a.m.

The operating noise level from the proposed power plant would be approximately 49 dBA at the nearest existing sensitive receiver, which is 1.6 dB higher than the ambient  $L_{90}$  noise level in the quietest hour of the 24-hour day, and 2 dB lower than the average  $L_{90}$  value during nighttime hours. This noise level would be below the significance criterion. As a result, the noise levels associated with the proposed project would not cause any significant noise impacts on the residential community. It should be noted that the proposed Condition of Certification **NOISE-6** would require that the project noise levels at the closest residential receptor would not be any greater than the specified noise level standard of 50 dBA. This is less than 3 dB higher than the noise level during the quietest hour of the 24-hour day.

The City and County of San Francisco is currently processing an application to develop 155 live/work units at 1300 Illinois Street, which is on the corner of 23<sup>rd</sup> Street diagonally opposite the project site. These units would include both residential and commercial uses, much closer to the power plant than any other noise sensitive land uses. The power plant has the potential to produce noise levels that would exceed the residential standards of the San Francisco noise ordinance at that location. According to the applicant, the predicted power plant noise level at 1300 Illinois Street is 60 dBA. Assuming an ambient noise level of about 54 dBA, the cumulative noise level would be 61 dBA. This is an increase of about 7 dBA, which is potentially significant. To ensure that adequate measures are taken to mitigate operational noise at the live-work units, staff has proposed measures (see proposed Condition of Certification **NOISE-6**, below) to limit the increase in ambient noise levels.

The zoning at 1300 Illinois Street is currently M-2, in which the permitted sound level at any time of the day or night is 75 dBA. The City is expected to treat the compatibility of live-work units in a manner consistent with the current zoning. Therefore the project noise level would be in compliance with the City Municipal Code.

### **Tonal and Intermittent Noises**

One possible source of annoyance would be strong tonal noises, individual sounds that, while not louder than permissible levels, stand out in sound quality. To ensure the avoidance of such tonal sound, the noise control design of Unit 7 can be balanced to bring as many noise sources as possible to the same relative sound level, causing them all to blend without any one source standing out. Another potentially annoying source of noise from a combined cycle power plant is the intermittent or occasional actuation of steam relief valves. The hissing noise from these valves can be largely mitigated by the installation of adequate mufflers. To ensure that adequate measures are taken to mitigate tonal and intermittent noise sources, staff has proposed measures (see



proposed Condition of Certification **NOISE-6**, below) to limit tonal and intermittent steam relief noise.

### **Linear Facilities**

The linear facilities associated with the proposed Unit 7 facility are transmission lines within city streets. The lines would be buried below ground and would not produce any audible noise. Thus, there will be no noise impacts associated with the transmission lines.

Noise sources associated with power transmission include occasional breaker operations in the switchyard, and corona noise and very low magnetostriction hum from the conductors. Breaker noise is considered impulsive in nature, lasting a very short duration, and may occur only a very few times per year. Corona noise is characterized as a buzz or hum and is usually worse when the conductors are wet, such as in rain or fog. No significant noise impact will occur because the new transmission line would not be located near sensitive receptors (SECAL 2000a, AFC § 5.2).

### **Worker Effects**

The Applicant recognizes the need to protect plant operating and maintenance personnel from noise hazards, and commits to comply with applicable LORS, beginning with an occupational noise evaluation after the project has been constructed.

With proper execution of the Hearing Conservation Program, as well as with the implementation of proposed Condition of Certification **NOISE-7**, no occupational safety impacts are anticipated from operational noise.

## **CUMULATIVE IMPACTS**

The *CEQA Guidelines*, Title 14, California Code of Regulations, Section 15130, requires a discussion of cumulative environmental impacts to determine whether the project's incremental effect is cumulatively considerable. Cumulative impacts are defined as those impacts that are created because of the combination of the project evaluated together with other projects causing related impacts. The *CEQA Guidelines* require that the discussion reflect the severity of the impacts and the likelihood of their occurrence, but need not provide as much detail as the discussion of the impacts attributable to the proposed project alone.

The *CEQA Guidelines* provide that an analysis may summarize growth projections in an adopted general plan or in a prior certified environmental document. Alternatively, one may compile a list of past, present, and probable future projects producing related or cumulative impacts. The second method has been utilized for the purposes of this Staff Assessment.

The City and County of San Francisco has zoned the project area for heavy and light industrial uses. The area is currently well developed with industrial land uses, and it is not known whether any other major construction projects are planned for the area. The Unit 7 facility would be consistent with the City's plans and management policies regarding land use. In addition, it is assumed that the cumulative noise level associated with constructing this project would not significantly increase the ambient noise level in

the area, especially in view of the existing industrial land uses and the nearby freeway. As a result, there are no significant cumulative effects associated with construction the Unit 7 Project (SECAL 2000a, AFC Figure 8.4-2).

## **ENVIRONMENTAL JUSTICE**

Staff has reviewed Census 2000 information that shows the minority population is greater than fifty percent within a six-mile radius of the proposed Potrero Power Plant Unit 7 Project (please refer to Socioeconomics Figure 1 in this Staff Analysis), and Census 1990 information that shows the low-income population is less than fifty percent within the same radius. Based on the noise analysis, staff has identified no potential unmitigated significant direct or cumulative impacts resulting from the construction or operation of the project, and therefore environmental justice issues are relevant to this project.

The potentially significant noise impacts would affect minority population areas. The recommended Conditions of Certification for this project include mitigation measures to reduce noise impacts to a less than significant level. The recommended mitigation measures are both specific equipment requirements and overall noise performance standards requiring that the owner design and implement the acoustical treatments necessary to meet specified noise level limits. These measures would directly benefit all residential areas, including the minority population. The noise impacts will be fully mitigated.

Although the live-work units are not currently built or occupied, one may assume that the occupants will share the demographic characteristics of the adjacent area. Assuming that noise mitigation is provided as recommended in NOISE-6, to ensure that there is no significant change in ambient noise levels, staff concludes that there will be no significant direct or cumulative noise impacts for the minority population within the live-work units.

## **FACILITY CLOSURE**

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Upon closure of the facility, all operational noise will cease; no further adverse impacts from operation will be possible. The remaining potential noise source will be that caused by the dismantling of the structures and equipment, and any site restoration work that may be performed. Since this noise will be similar to that caused by the original construction of the Unit 7 Project, it can be treated similarly. That is, noisy work can be performed during daytime hours, with machinery and equipment properly equipped with mufflers. Any noise LORS then in existence would apply; applicable Conditions of Certification included in the Energy Commission Decision would also apply unless properly modified.

## RESPONSE TO PUBLIC AND AGENCY COMMENTS ON THE PSA

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### CITY AND COUNTY OF SAN FRANCISCO (CCSF)

**CCSF-7B:** *The City states that “Both CCSF and PG&E are planning transmission additions in the same vicinity during the same general time frame. Coordination of this work is desirable not only to reduce costs and maximize electric reliability, but also to reduce the impacts of construction work on the surrounding community and environment. Such coordination should be required, not merely encouraged. The PSA encourages the Applicant to pursue ‘to the extent feasible’ shared trenches or other collocation strategies.”*

**Response:** As noted above, recommended Condition of Certification **NOISE-8** limits construction noise in a manner consistent with the City of San Francisco Municipal Code. The applicant would be well advised to pursue the use of shared trenches and other co-location strategies to reduce potential scheduling conflicts, or potential use of multiple pieces of construction equipment, that could result in exceeding the noise level, time of day, or location requirements of the Municipal Code.

**CCSF-8:** *The City requests the applicant be required to prepare a noise control plan for construction and operation of the power plant.*

**Response:** Recommended Condition of Certification **NOISE-8** limits construction noise in a manner consistent with the City of San Francisco Municipal Code. Recommended Conditions of Certification **NOISE-1**, **NOISE-2**, **NOISE-4**, **NOISE-5** and **NOISE-6** impose requirements for addressing noise complaints and for achieving specified noise level limits to ensure compliance with LORS and to ensure that no significant noise impacts will result from the power plant operation.

### PIER 70 CITIZENS ADVISORY GROUP (P70)

**P70-9:** *The Advisory Group requests the applicant be required to prepare a noise control plan for construction and operation of the power plant.*

As noted above, recommended Condition of Certification **NOISE-8** limits construction noise in a manner consistent with the City of San Francisco Municipal Code. In addition, recommended Conditions of Certification **NOISE-1**, **NOISE-2**, **NOISE-4**, **NOISE-5** and **NOISE-6** impose requirements for addressing noise complaints and for achieving specified noise level limits to ensure compliance with LORS and to ensure that no significant noise impacts will result from the power plant operation.

## CONCLUSIONS AND RECOMMENDATIONS

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Staff concludes that Unit 7 will likely be built and operated to comply with all applicable noise laws, ordinances, regulations and standards. Staff further concludes that the Unit 7 facility, mitigated as described above, will likely present no significant adverse noise impacts

Staff recommends that the following proposed Conditions of Certification be adopted to ensure compliance with all applicable noise LORS, and to ensure that no significant noise impacts will result from the facility construction or operation.

## PROPOSED CONDITIONS OF CERTIFICATION

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**NOISE-1** Prior to the start of ground disturbance, the project owner shall notify all residents and business owners within one-half mile of the site or adjacent to the transmission line route, by mail or other effective means, of the commencement of project construction. At the same time, the project owner shall establish a telephone number for use by the public to report any undesirable noise conditions associated with the construction and operation of the project. If the telephone is not staffed 24 hours per day, the project owner shall include an automatic answering feature, with date and time stamp recording, to answer calls when the phone is unattended. This telephone number shall be posted at the project site during construction in a manner visible to passersby. This telephone number shall be maintained until the project has been operational for at least one year.

**Verification:** At least 15 days prior to the start of ground disturbance, the project owner shall transmit to the CPM a statement, signed by the project manager, attesting that the above notification has been performed, and describing the method of that notification. If the notification is written, the statement shall include a copy of the notification. This statement shall also attest that the telephone number has been established and posted at the site. The telephone number shall be included in the statement.

**NOISE-2** Throughout the construction and operation of the project, the project owner shall document, investigate, evaluate, and attempt to resolve all project-related noise complaints.

**Protocol:** The project owner or authorized agent shall:

- use the Noise Complaint Resolution Form (see Exhibit 1 for example), or functionally equivalent procedure acceptable to the CPM, to document and respond to each noise complaint;
- attempt to contact the person(s) making the noise complaint within 24 hours;
- conduct an investigation to determine the source of noise related to the complaint;
- if the noise is project related, take all feasible measures to reduce the noise at its source; and
- submit a report documenting the complaint and the actions taken. The report shall include: a complaint summary, including final results of noise reduction efforts; and if obtainable, a signed statement by the complainant stating that the noise problem is resolved to the complainant's satisfaction.

**Verification:** Within 30 days of receiving a noise complaint, the project owner shall file a copy of the Noise Complaint Resolution Form, or similar instrument approved by the CPM, with the City and County of San Francisco Department of Environmental Health, and with the CPM, documenting the resolution of the complaint. If mitigation is required to resolve a complaint, and the complaint is not resolved within a 30-day

period, the project owner shall submit an updated Noise Complaint Resolution Form when the mitigation is finally implemented.

**NOISE-3** Prior to the start of ground disturbance, the project owner shall submit to the CPM for review a noise control program. The noise control program shall be used to reduce employee exposure to high noise levels during construction and also to comply with applicable OSHA and Cal-OSHA standards.

**Verification:** At least 30 days prior to the start of ground disturbance, the project owner shall submit to the CPM the above referenced program. The project owner shall make the program available to OSHA upon request.

**NOISE-4** The project owner shall employ a low-pressure steam blow process. The project owner shall submit a description of this process, with expected noise levels and projected period of execution, to the CPM, who shall review the proposal with the objective of ensuring that the resulting noise levels do not exceed the ambient background noise level ( $L_{90}$ ) at the most-affected residential property by more than 5 dBA. If the low-pressure process proposal is approved by the CPM, the project owner shall implement the process in accordance with the requirements of the CPM.

**Verification:** At least 15 days prior to the first steam blow, the project owner shall submit to the CPM drawings or other information describing the process and the noise levels expected, and a description of the steam blow schedule.

**NOISE-5** The project owner shall notify all residents or business owners within one mile of the site of the planned steam blow activity, and shall make the notification available to other area residents in an appropriate manner. The notification may be in the form of letters to the area residences, telephone calls, fliers or other effective means. The notification shall include a description of the purpose and nature of the steam blow(s), the proposed schedule, the expected sound levels, and the explanation that it is a one-time operation and not a part of normal plant operations.

**Verification:** At least 15 days prior to the first steam blow(s), the project owner shall notify the above entities, and, within five days of notifying these entities, the project owner shall send a letter to the CPM confirming that they have been notified of the planned steam blow activities, including a description of the method(s) of that notification.

**NOISE-6** The project design and implementation shall include noise mitigation measures adequate to ensure that operation of the project will not cause resultant noise levels to exceed the noise standards of the City Municipal Code. Specifically, noise due to operation of the project shall not exceed an hourly average noise level of 50 dBA at the most affected residence, or an hourly average noise level of 75 dBA at the nearest industrial property line, nor shall it cause noise levels to exceed the ambient background noise level ( $L_{90}$ ) at the live/work units at 1300 Illinois Avenue (if constructed) by more than 5 dBA.

No new pure tone components may be produced by operation of the project. No single piece of equipment shall be allowed to stand out as a source of noise that draws legitimate complaints. Steam relief valves shall be adequately treated or located to preclude noise that draws legitimate complaints.

**Protocol:** Within 30 days of the project first achieving an output of 80 percent or greater of rated capacity, the project owner shall conduct a 25-hour community noise survey, utilizing the same monitoring site used for the ambient noise survey. The survey shall also include measurement of the one-third octave band sound pressure levels to ensure that no new pure-tone noise components have been introduced. If the results from the survey indicate that the project noise level at any residential location exceeds the standards and requirements cited above, additional mitigation measures shall be implemented to reduce noise to a level of compliance with these limits.

**Verification:** Within 30 days after the project first achieves an output of 80 percent or greater of rated capacity, the project owner shall submit a summary report of the noise survey to the City and County of San Francisco Department of Environmental Health, and to the CPM. Included in the report shall be a description of any additional mitigation measures necessary to achieve compliance with the above listed noise limits, and a schedule, subject to CPM approval, for implementing these measures. If additional mitigation measures are necessary within 30 days of completion of installation of these measures, the project owner shall submit to the CPM a summary report of a new noise survey, performed as described above and showing compliance with this condition.

**NOISE-7** The project owner shall conduct an occupational noise survey to identify the noise hazardous areas in the facility. The survey shall be conducted within 30 days after the facility is in full operation, and shall be conducted by a qualified person in accordance with the provisions of Title 8, California Code of Regulations, sections 5095-5099 (Article 105) and Title 29, Code of Federal Regulations, section 1910.95. The survey results shall be used to determine the magnitude of employee noise exposure. The project owner shall prepare a report of the survey results and, if necessary, identify proposed mitigation measures that will be employed to comply with the applicable California and federal regulations.

**Verification:** Within 30 days after completing the survey, the project owner shall submit the noise survey report to the CPM. The project owner shall make the report available to OSHA and Cal-OSHA upon request.

**NOISE-8** Noisy construction work (that which causes offsite annoyance, as evidenced by the filing of a legitimate noise complaint) shall be restricted to the times of day delineated below:

7 a.m. to 8 p.m., unless otherwise permitted in accordance with San Francisco Municipal Code Section 2908.

Construction equipment shall comply with the noise level limits of the San Francisco Municipal Code, Section 2907. Haul trucks and other engine-powered equipment shall be equipped with adequate mufflers. Haul trucks shall be operated in accordance with posted speed limits. Truck engine exhaust brake use shall be limited to emergencies.

**Verification:** The project owner shall transmit to the CPM in the first Monthly Construction Report a statement acknowledging that the above restrictions will be observed throughout the construction of the project.

## EXHIBIT 1 - NOISE COMPLAINT RESOLUTION FORM

<b>Potrero Power Plant Unit 7 (00-AFC-4)</b>		
<b>NOISE COMPLAINT LOG NUMBER</b> _____		
Complainant's name and address:  		
Phone number: _____		
Date complaint received: _____ Time complaint received: _____		
Nature of noise complaint:  		
Definition of problem after investigation by plant personnel:  		
Date complainant first contacted: _____		
Initial noise levels at 3 feet from noise source _____	dBA	Date: _____
Initial noise levels at complainant's property: _____ _____	dBA	Date: _____
Final noise levels at 3 feet from noise source: _____	dBA	Date: _____
Final noise levels at complainant's property: _____ _____	dBA	Date: _____
Description of corrective measures taken:  		
Complainant's signature: _____		Date: _____
Approximate installed cost of corrective measures: \$ _____		
Date installation completed: _____		
Date first letter sent to complainant: _____		(copy attached)
Date final letter sent to complainant: _____		(copy attached)
This information is certified to be correct:  		
Plant Manager's Signature: _____		

(Attach additional pages and supporting documentation, as required).



## REFERENCES

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State of California, California Department of Health Services), Office of Noise Control. *Model Community Noise Control Ordinance*, 1977.

Transportation Noise Section of the Environmental Protection Element of the City and County of San Francisco General Plan, I.6.11 *et seq*, 1974.

San Francisco Municipal Code, Article 29, Sections 2900-2918, 1972.

Kryter, Karl D. *The Effects of Noise on Man*. Academic Press, N.Y., 1970.

Office of Planning and Research. 1990. State of California General Plan Guidelines. June.

SECAL (Southern Energy California). 2000 a. Application for Certification, Potrero Power Plant Unit 7 Project (00-AFC-4). Submitted to the California Energy Commission, May 31.

### **NOISE: APPENDIX A FUNDAMENTAL CONCEPTS OF COMMUNITY NOISE**

To describe noise environments and to assess impacts on noise sensitive area, a frequency weighting measure that simulates human perception is customarily used. It has been found that A-weighting of sound pressure levels best reflects the human ear's reduced sensitivity to low frequencies, and correlates well with human perceptions of the annoying aspects of noise. A-weighted sound pressure levels, or sound levels, in decibels (dB), often denoted as dBA, are cited in most noise criteria. Decibels are logarithmic units that conveniently compare the wide range of sound pressure levels to which the human ear is sensitive. Table A1 provides a description of technical terms related to noise.

Noise environments and consequences for human activities are usually well represented by an equivalent A-weighted sound level over a given time period ( $L_{eq}$ ), or by average day and night levels with a nighttime weighting of 10 dB ( $L_{dn}$ ). Noise levels are generally considered low when ambient levels are below 45 dBA, moderate in the 45-to 60 dBA range, and high above 60 dBA. Outdoor day-night sound levels vary over a range of 50 dB depending on the specific type of land use. In wilderness areas, the  $L_{dn}$  noise levels average approximately 35 dB, 50 dB in small towns or wooded residential areas, 65 to 75 dB in major metropolis downtown (e.g., Los Angeles), and 80 to 85 dB very near freeways and airports. Although people often accept the higher noise levels associated with very noisy urban residential and residential-commercial zones, they nevertheless are considered to be levels of noise adverse to public health.

Various environments can be characterized by noise levels that are generally considered acceptable or unacceptable. Lower levels are expected in rural or suburban areas than would be expected for commercial or industrial zones. Nighttime ambient noise levels in urban environments are about seven decibels lower than the

corresponding average daytime levels. The day-to-night difference in rural areas away from roads and other human activity can be considerably less. Areas with full-time human occupation that are subject to nighttime noise, which does not decrease relative to daytime levels, are often considered objectionable. Noise levels above 45 dBA at night can result in the onset of sleep interference effects (USEPA, 1971). At 70 dBA, sleep interference effects become considerable.

In order to help the reader understand the concept of noise measured in decibels (dBA), NOISE: Table A2 has been provided to illustrate common noises and their associated A-weighted sound pressure levels.

**NOISE: Table A1**  
**Definition of Some Technical Terms Related to Noise**

<b>Terms</b>	<b>Definitions</b>
Decibel, dB	A unit describing the amplitude of sound, equal to 20 times the logarithm to the base 10 of the ratio of the pressure of the sound measured to the reference pressure, which is 20 micropascals (20 micronewtons per square meter).
Frequency, Hz	The number of complete pressure fluctuations per second above and below atmospheric pressure.
A-Weighted Sound Level, dB	The sound pressure level in decibels as measured on a Sound Level Meter using the A-weighting filter network. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the frequency response of the human ear, and correlates well with subjective reactions to noise. All sound pressure levels in this testimony are A-weighted.
L10, L50, & L90	The A-weighted sound levels that are exceeded 10%, 50%, and 90% of the time, respectively, during the measurement period. L90 is generally taken as the background noise level.
Equivalent Noise Level $L_{eq}$	The energy average A-weighted sound pressure level during the noise level measurement period.
Community Noise Equivalent Level, CNEL	The average A-weighted sound pressure level during a 24-hour day, obtained after addition of 4.8 decibels to sound levels in the evening from 7 p.m. to 10 p.m., and after addition of 10 decibels to sound levels in the night between 10 p.m. and 7 a.m.
Day-Night Level, $L_{dn}$	The average A-Weighted sound pressure level during a 24-hour day, obtained after addition of 10 decibels to levels measured in the night between 10 p.m. and 7 a.m.
Ambient Noise Level	The composite of noise from all sources, near and far. The normal or existing level of environmental noise at a given location.
Intrusive Noise	That noise that intrudes over and above the existing ambient noise at a given location. The relative intrusiveness of a sound depends upon its amplitude, duration, frequency, and time of occurrence and tonal or informational content, as well as the prevailing ambient noise level.
Source: California Department of Health Services 1976.	

<b>NOISE: Table A2</b> <b>Typical Environmental and Industry Sound Levels</b>			
Source and Given Distance from that Source	A-Weighted Sound Level in Decibels (dBA)	Environmental Noise	Subjective Impression
Civil Defense Siren (100')	140-130		Pain Threshold
Jet Takeoff (200')	120		
Very Loud Music	110	Rock Music Concert	Very Loud
Pile Driver (50')	100		Very Loud
Ambulance Siren (100')	90	Boiler Room	Very Loud
Freight Cars (50')	85		
Pneumatic Drill (50')	80	Printing Press Kitchen with Garbage Disposal Running	Loud
Freeway (100')	70		Moderately Loud
Vacuum Cleaner (100')	60	Data Processing Center Department Store/Office	
Light Traffic (100')	50	Private Business Office	Quiet
Large Transformer (200')	40		
Soft Whisper (5')	30	Quiet Bedroom	
	20	Recording Studio	
	10		Threshold of Hearing
Source: Peterson and Gross 1974			

## **SUBJECTIVE RESPONSE TO NOISE**

The adverse effects of noise on people can be classified into three general categories:

- Subjective effects of annoyance, nuisance, dissatisfaction.
- Interference with activities such as speech, sleep, and learning.
- Physiological effects such as anxiety or hearing loss.

The sound levels associated with environmental noise, in almost every case, produce effects only in the first two categories. Workers in industrial plants can experience noise effects in the last category. There is no completely satisfactory way to measure the subjective effects of noise, or of the corresponding reactions of annoyance and dissatisfaction, primarily because of the wide variation in individual tolerance of noise.

One way to determine a person's subjective reaction to a new noise is to compare the level of the existing (background) noise, to which one has become accustomed, with the level of the new noise. In general, the more the level or the tonal variations of a new noise exceed the previously existing ambient noise level or tonal quality, the less acceptable the new noise will be, as judged by the exposed individual.

With regard to increases in A-weighted noise levels, knowledge of the following relationships (Kryter 1970) can be helpful in understanding the significance of human exposure to noise.

1. Except under special conditions, a change in sound level of one dB cannot be perceived.
2. Outside of the laboratory, a 3-dB change is considered a barely noticeable difference.
3. A change in level of at least five dB is required before any noticeable change in community response would be expected.
4. A 10-dB change is subjectively heard as an approximate doubling in loudness and almost always causes an adverse community response.

### **COMBINATION OF SOUND LEVELS**

People perceive both the level and frequency of sound in a non-linear way. A doubling of sound energy (for instance, from two identical automobiles passing simultaneously) creates a three dB increase (i.e., the resultant sound level is the sound level from a single passing automobile plus three dB). The rules for decibel addition used in community noise prediction are:

<b>NOISE: Table A3</b>	
<b>Addition of Decibel Values</b>	
When two decibel values differ by:	Add the following amount to the larger value
0 to 1 dB	3 dB
2 to 3 dB	2 dB
4 to 9 dB	1 dB
10 dB or more	0
Figures in this table are accurate to $\pm 1$ dB.	

Source: Thumann, Table 2.3

### **SOUND AND DISTANCE**

- Doubling the distance from a noise source reduces the sound pressure level by 6 dB.
- Increasing the distance from a noise source ten times reduces the sound pressure level by 20 dB.

### **WORKER PROTECTION**

OSHA noise regulations are designed to protect workers against the effects of noise exposure, and list permissible noise level exposure as a function of the amount of time to which the worker is exposed:

**NOISE: Table A4**  
**OSHA Worker Noise Exposure Standards**

Duration of Noise (Hrs/day)	A-Weighted Noise Level (dBA)
8.0	90
6.0	92
4.0	95
3.0	97
2.0	100
1.5	102
1.0	105
0.5	110
0.25	115

Source: OSHA Regulation

# PUBLIC HEALTH

Testimony of Obed Odoemelam, Ph.D. and Mike Ringer

## INTRODUCTION

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Operating the proposed Unit 7 addition to the Potrero Power Plant (or Potrero PP) would produce combustion products and possibly expose the general public and workers to these pollutants as well as the toxic chemicals associated with the electricity generation process. Such exposures would be considered significant if they occur at levels that can produce specific health symptoms in humans and are the focus of federal and state requirements for specific technological and operational controls. The issue of possible worker exposure is addressed in the **Worker Safety and Fire Protection** section while the health significance of exposure to the project-related electric and magnetic fields (EMF) is addressed in the **Transmission Line Safety and Nuisance** section. Since the project is proposed for a site of past industrial activities, both the applicant, Southern Energy of California, SECAL, (now Mirant Corporation or Mirant), and PG&E, the former Potrero PP owner, have conducted several investigations (Mirant 2000a 8.13-1 and 8.13-2, Appendix M, and Mirant 2000Seds1 and 2001Seds2) to (a) assess the nature and extent of existing soil and groundwater contamination and (b) establish how best to incorporate related findings into their plan for the necessary clean-up. Findings from these investigations are presented in the **Waste Management** and **Soil and Water Resources** sections with respect to (1) the types of contaminants involved, (2) their respective soil and water levels, and (3) requirements for safe handling as encountered during project-related demolitions or site excavation and grading.

The air pollutants of specific concern for the proposed and similar gas-fired projects are categorized as criteria pollutants and non-criteria pollutants also known as air toxics or toxic air contaminants (TACs). The criteria pollutants differ from the air toxics in having specific air quality standards to protect against significant impacts in humans. Such impacts are discussed in the Attachment (A) to this analysis along with the rationale for each applicable standard (as listed in the **Air Quality** section). When a project is proposed for an area with specific air quality violations, the impacts of the pollutants in question are discussed in this **Public Health** section to emphasize the need for rigorous mitigation. These criteria pollutants are regulated statewide by implementing specific technological and administrative requirements formulated by state and federal agencies to ensure compliance with the applicable air quality standards. The state's Air Pollution Management Districts or Air Districts (each of which would issue specific compliance-related permits before a project is built) are responsible for ensuring such compliance at the local level. Details of such requirements are specified in each Air District's rules and regulations.

The Air District for this project is the Bay Area Air Quality Management District or BAAQMD whose applicable regulations for the project's criteria pollutants are identified in the **Air Quality** section as regulations 2, 6, 9, and 10. The requirements in these regulations are formulated to ensure continued compliance with all applicable standards or continued progress towards compliance according to an EPA-approved schedule. Each compliance attainment goal is achieved by applying the best available control

technology (BACT) to each project while fully offsetting its pollutant impacts from corresponding emission reductions at other sources within the District. Staff usually considers the effectiveness of the Air District's emission control and offset requirements in assessing the need for additional mitigation.

Each Air District's program for criteria pollutant control usually differs from its program for air toxics control in terms of impact assessment methods and compliance procedures. The differences in compliance procedures are best addressed separately in the **Air Quality** section for criteria pollutants, and the **Public Health** section for the non-criteria pollutants. The non-criteria pollutants of specific concern in this analysis are emitted in much smaller amounts from common sources than the criteria pollutants. Most are emitted together as volatile organic compounds (VOCs) while the others are emitted as toxic metals. Their respective levels from electricity generation will differ according to the type of fuel utilized. The constituents of most concern for Unit 7 and similar projects are well characterized with respect to emission rates and potential health impacts, which are considered the same way for all sources in the state. Since there are no air quality standards for these air toxics, their District-wide levels are minimized by ensuring that (a) all unavoidable additions are at levels that each Air District considers less than significant with respect to health and that (b) emissions from modified sources are at rates lower than before the modification. Progress towards such basin-wide reductions is assessed through specific Air District TAC programs implemented in compliance with federal and state laws, ordinances, regulations and standards (LORS).

The first purpose of this **Public Health** is to determine whether Unit 7's toxic emissions will have the potential to cause significant adverse health impacts. The second is to establish whether the applied emissions controls would be operated in keeping with applicable emission LORS, which differ from those that apply to the criteria pollutants as addressed in the **Air Quality** section. In any case of non-compliance, or potentially significant impacts, staff would recommend mitigation to reduce such impacts to less than significant levels, or the extent feasible.

## **LAWS ORDINANCES, REGULATIONS AND STANDARDS (LORS)**

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### **FEDERAL**

#### ***THE CLEAN AIR ACT OF 1970 (42 U.S.C., SECTION 7401 ET SEQ.)***

This section of the act required establishment of the previously noted ambient air quality standards necessary to protect against effects in humans and the general environment. These standards were established by the United States Environmental Protection Agency (U.S. EPA) for the major criteria pollutants: nitrogen oxides (NO<sub>x</sub>), ozone, sulfur dioxide, carbon monoxide, sulfates, lead, and particulate matter with a diameter of 10 microns or less (PM<sub>10</sub>), or 2.5 microns or less (PM<sub>2.5</sub>). The standards for PM<sub>2.5</sub> are yet to be implemented as noted in Attachment A.



## **The Clean Air Act of 1970 (42 U.S.C., section 7412)**

This section requires that the Maximum Achievable Control Technology (MACT) be applied to any new source that emits more than 10 tons per year of a particular toxic air pollutant or any combination of air toxics.

## **STATE**

### **California Health and Safety Code section 39606**

This section of the code requires the California Air Resources Board (ARB) to establish California's ambient air quality standards to reflect the California-specific conditions influencing its air quality. Such standards (which are generally more stringent than the federal standards) have been established by the ARB for ozone, carbon monoxide, sulfur dioxide, PM10, lead, hydrogen sulfide, vinyl chloride and nitrogen dioxide. The California standards are listed together with the corresponding federal standards in the **Air Quality** section.

### **California Health and Safety Code section 41700**

This section of the code states that "No person shall discharge from any source whatsoever such quantities of air contaminants or other material which cause injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public, or which endanger the comfort, repose, health, or safety of any such persons or the public, or which cause or have a natural tendency to cause injury or damage business or property".

### **California Health and Safety Code section 39650 et seq.**

This section of the code mandates the California Environmental Protection Agency (Cal-EPA) to establish safe exposure limits for air toxics and identify the best available methods for controlling their emission. These laws also require the new source review rules (NSR) for each Air District to include regulations establishing procedures for controlling the emission of these pollutants. The emission rates for the air toxics from natural gas combustion are listed in ARB's Toxic Emissions Factor database for natural gas-fired combustion turbines to allow the potential impacts of such pollutants to be assessed the same way for all sources in the state. Cal-EPA has developed specific cancer potency estimates for assessing any cancer risk they may pose at specific exposure levels. For toxic air pollutants that do not cause cancer, Cal-EPA established specific no-effects levels (known as reference exposure levels or RELs) for assessing the likelihood of health effects at specific exposure levels. Such health effects would be considered significant only when exposure exceeds these reference levels. The Energy Commission staff uses these Cal-EPA potency estimates and reference exposure values in its health risk analyses.

### **Health and Safety Code section 44300 et seq.**

This section of the code requires facilities, which emit large quantities of criteria pollutants and any amount of non-criteria pollutants to provide an inventory of toxic emissions to the local air district within specific time frames. Operators of such facilities may also be required to prepare a quantitative health risk assessment to address the potential health risks involved. The ARB ensures statewide implementation of these requirements through the state's Air Districts.

## LOCAL

### **Bay Area Air Quality Management District Rule 2-1-316**

This rule was established by the Air District for local implementation of provisions of the Health and Safety Code section 44300. The applicant has complied with the related requirements by submitting the results of their health risk assessment for the Unit 7 project.

### **Bay Area Air Quality Management District Regulation 1, Section 301, "Public Nuisance" (Amended 10/98).**

Requirements of this regulation allow for compliance with the provisions of the Health and Safety Code, section 41700.

## SETTING

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### **POTENTIALLY AFFECTED AREA**

As discussed by the applicant (Mirant 2000a, pages 2-1, 8.1-2 and 8.8-6 through 8.8-12), the proposed Unit 7 project will be constructed (as a part of the existing Potrero Power Plant) on a 6.5-acre portion of the 20 acres, which the Potrero Power Plant presently occupies. This location is on the eastern side of the City of San Francisco along the western shore of San Francisco Bay that is zoned for commercial and industrial uses. Nearby cities in this urban area include South San Francisco and Daly City to the south, and Alameda and Oakland across the Bay, to the north. The site is surrounded by industrial and commercial facilities to the north, west, and south, with San Francisco Bay to the east. There are a few scattered residences among these establishments, especially along Third Street. Businesses in this area include shipping piers and dry dock facilities along the waterfront, vehicle storage and impoundment yards to the north, gas stations, warehouses, factories and small commercial establishments to the west, and a railroad yard and trucking companies to the south. The closest housing development is approximately 500 feet from the site, west of Third Street. From this point, the population increases in density to the west for about  $\frac{3}{4}$  mile, centered in the Potrero Hill neighborhood of mostly minority residents. Other neighborhoods within 2 miles of the project site are Bernal Heights to the southwest, and Bayview/Hunters Point to the south. Residences in the Unit 7 project area are mostly single-family and multi-family homes or apartments adjacent to one another (Mirant 2000a, pages 8.11-6 and 8.112-2).

### **EXISTING AIR QUALITY**

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The Bay Area Air Quality District encompasses the whole or parts of the following nine counties in the San Francisco Bay Area: San Francisco, San Mateo, Santa Clara, Alameda, Contra Costa, Napa, and Marine. Since the state's Air Districts are delineated as distinct geographic zones of uniform air mixing, pollution reductions at any source within a District (to offset the contribution from a new source) is regarded as yielding a net air quality benefit on a District-wide basis. The continuing challenge is to ensure that such offsetting reductions are made as close to the project site as possible

to maximize their counteracting effects at the local level. This impact reduction approach has been largely responsible for the downward trend in the levels of criteria pollutants despite unavoidable, population growth-related increases in their commercial and industrial sources.

As noted by the applicant (Mirant 2000a, pages 8.1-3, 8.1-4 and 8.1-19, 8.1-39 through 8.1-41 and Mirant 2001DRespSAEJ Data Response No. 61), and more fully discussed in the **Air Quality** section, BAAQMD is designated as currently violating the federal and state air quality standard for ozone while violating the short-term (24-hour) particulate matter (PM<sub>10</sub>) standard only for the more stringent state standard. However, the historical air quality data for the project location shows that the area's criteria pollutant levels have been below the most stringent air quality standards in the last ten years (1990 to 2000) with the exception of PM<sub>10</sub>.

The historical data for the area's PM<sub>10</sub> levels is presented in Air Quality Figure 1 in the **Air Quality** where it shows a declining trend in the noted ten-year measurement period. The highest concentrations are normally measured during nighttime hours in the in the winter months. These periodic violations occur because of emissions from vehicles, road dust, domestic fuel use, cooking, residential wood burning, and construction activities. The declining trend in ambient levels reflects the effectiveness of the Air District's PM<sub>10</sub> control approach.

The most recent data (as discussed in the **Air Quality** section) shows that the state's 24-hour standard was violated two times in both January and May, and one time in June 30 of 2001. The Air Quality staff believes such violations to be directly related to the operation of older, more polluting generating plants during power shortages, increased use of small diesel engines for electricity generation in private businesses, and home heating with fuel other than the less-polluting electricity and natural gas.

The area's PM<sub>10</sub> consists of fugitive dust together with secondarily formed particulate nitrates, sulfates, and chlorides and ammonium salts. As noted in the **Air Quality** section, the chloride particulates (sea salt) may account for between 3% and 30 % of the total PM<sub>10</sub>, identifying the Bay's sea salt as an important contributor to the area's PM<sub>10</sub> problem. PM<sub>2.5</sub> (which derives mostly from combustion processes as noted in Attachment A), typically makes up between 40% and 50 % of all measured PM<sub>10</sub>. Measured levels at the project site from January 1999 to December 2000 (as shown in Air Quality Figure 4) were found to be significantly below the new 65 µg/m<sup>3</sup>, 24-hour federal PM 2.5 standard even when the PM<sub>10</sub> levels were above the applicable 24-hour standard. This establishes the project area as unlikely to violate the new federal 24-hr PM 2.5 when it is implemented. This potential lack of violation is important to staff's impact assessment in light of the newly identified role of PM<sub>2.5</sub> as a more accurate predictor of particulate health effects than PM<sub>10</sub>.

BAAQMD monitors ambient levels of toxic air pollutants through a District-wide air toxics monitoring network. Such monitoring is conducted as part of the District's Toxic Air Contaminant Control Program. Although these toxic pollutants are capable of both cancer and non-cancer effects, the District uses the cancer risk estimates as sensitive indicators of their health hazards as well as success at emission reductions from toxic

sources. Using existing assessment methods, the District estimated the 1999 ambient levels of these air toxics as posing a lifetime risk of 186 in one million to the average District resident. The risk for 1991 levels was 356 in a million, pointing to the effectiveness of the Air District's control program and gasoline-related emission reductions, both of which are responsible for about 60 % of this risk. Stationary sources such as the proposed Unit 7, are identified as responsible for only a relatively small fraction of this air toxics-related risk, which one could compare with the background lifetime risk of 1 in 4 (25 %, or 250, 000 in a million) of the average individual. Current statewide focus is on vehicular diesel exhaust whose contribution now appear to be much higher than from the stationary industrial and commercial sources under the direct control of the Air Districts (BAAQMD 1999, p. 12).

## **EXISTING CONTAMINATION OF BAY FISH**

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The following discusses the origins and types of contamination of fish found in San Francisco Bay which may serve as a source of food to nearby residents.

In 1994, the San Francisco Bay Regional Water Quality Control Board (SFRWQCB), in cooperation with other state agencies, conducted a pilot study to measure the levels of chemical contaminants in fish in San Francisco Bay. The board found that chemicals in bay fish exceeded levels of potential concern and showed a need for further study. The chemicals or chemical groups of potential concern were polychlorinated biphenyls (PCBs), mercury, DDT (1,1,1-trichloro-2,2-bis(p-chlorophenyl)ethane), dieldrin, chlordane, and dioxins/furans.

The Office of Environmental Health Hazard Assessment (OEHHA), which is the state agency that issues sport fish consumption advisories, did a preliminary evaluation of the study data and confirmed the potential health hazard. OEHHA then issued an interim sport fish advisory, concluding that PCBs and methylmercury were the critical contaminants. The advisory gives guidelines for safe consumption levels of sport fish. Following these guidelines would protect against adverse health effects from these chemicals.

Mercury in bay sediments comes mainly from historic mining, according to a 1996 study published by the San Francisco Estuary Institute (SFEI). The California Coast Range has one of the world's great geologic deposits of mercury, and this deposit was mined intensively during the Gold Rush era to supply mercury for gold extraction in the Sierra Nevada.

PCBs are a large group of industrial chemicals, whose manufacture was stopped in the United States in 1977. Excessive exposure to PCBs may cause a wide variety of adverse health effects. Of particular concern are the effects on development in infants whose mothers have been exposed before and during pregnancy.

PCBs were used extensively in transformers, capacitors, and other electrical equipment. PCBs have entered the environment partly because of accidental leaks and fires in electrical equipment, past disposal in dumps, accidents in transport, and leakage from hazardous waste sites. In the environment they persist for a long time. Usually they

stick to soil or sediments and may remain there for years, but they also are found in the air, water and food. PCBs enter the bodies of fish from water, sediment, and from eating prey that have PCBs in their bodies.

Dioxin in fish tissues in San Francisco Bay has been a focus of much attention partly because dioxin is one of the most potent toxic chemicals known. Local environmental groups and the media have tended to focus on dioxin in bay fish over other contaminants that are an equal or greater problem. (PCBs contribute more than 90 percent of the potential cancer risk, whereas dioxins and furans may contribute only 2 to 10 percent of the risk.)

A 1996 Bay Area Air Quality Management District study estimated that diesel exhaust from cars, trucks, buses, equipment, and trains currently contributes 69 percent of the dioxin released to the air, followed by 16 percent from industrial sources, and 15 percent from residential wood burning. Airborne releases of dioxin in the Bay Area have been greatly reduced from earlier levels due to the closing of many medical waste incinerators and elimination of refuse burning.

A portion of dioxin emissions enter the bay by direct deposition and from storm water runoff that carries dioxin deposited on land from current and past emissions. A survey of dioxin in storm water runoff conducted by SFRWQCB confirmed the presence of dioxin in runoff.

The contaminants of concern found in fish in San Francisco Bay--mercury, dioxins, and PCBs, as well as some other chemicals, fall into a general class of chemicals that share common properties. They are highly toxic, long-lasting substances that can build up in the food chain to levels that are harmful to human and ecosystem health. They are associated with a range of adverse human health effects, including effects on the nervous system, reproductive and developmental problems, cancer, and genetic impacts. The challenge in reducing risks stems from the pollutants' ability to travel long distances, to transfer easily among air, water, and land, and to linger for years in people and the environment.

## **HEALTH STATUS OF THE POTENTIALLY EXPOSED POPULATION**

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As happens with all pollution sources of potential health significance, individuals who may be exposed in Unit 7's impact area would include both those with normal response to the biological impacts of environmental pollutants and those with heightened sensitivity to such impacts. These sensitive individuals include children, pregnant women, the elderly, and individuals with respiratory diseases such as asthma, bronchitis, and emphysema. They may be found in relatively small numbers in individual residences, or in relatively large numbers in specific establishments or institutions such as schools, daycare centers, eldercare homes hospitals, or recreation centers.

Given the noted violations of the existing short-term state PM10 standard, several area residents and environmental specialists have expressed concern over the prospects of further PM10 additions from the proposed Unit 7. They regard such additions as likely

to exacerbate the area's asthma and other respiratory problems especially among minority and low-income adults and children whose morbidity rates have been established from many published study results (and noted by the San Francisco Health Department in a 2000 publication) as higher than the rates for those within the general population. Further concern has been expressed about the potential for new, project-related carcinogens in the same minority and low-income area where results from analysis of the cancer rates for the 1988-1992 period were interpreted in an August 1995 San Francisco Department of Health publication as suggesting a higher rate of cancer than the Bay Area as a whole. While some cancer increases might be linked to specific factors (such as eating and drinking habits and smoking) that might differ among various socioeconomic groups, staff considers it inappropriate to consider minority or low-income individuals as necessarily cancer prone in light of the role of genetics in human sensitivity to carcinogenic effects. The absence of such sensitivity was indeed established from later, more complete studies by the Department who found the cancer rates for the 1993-1995 period to be similar to the rates for the Bay area as a whole (Glaser, Davis, and Aragon, 1998).

Exposure standards against the non-cancer impacts are established with safety margins considered adequate to protect against health symptoms among both the general public and the most sensitive individuals. In setting each standard, scientists first establish the lowest levels of exposure that are capable of causing adverse health impacts in the most sensitive experimental animal or human subjects and then apply appropriate safety factors to ensure protection against even the most sensitive individuals in the population. This means in the case of asthma for example, that the exposure limits that staff uses were established to protect against symptoms in area asthmatics and others with other respiratory diseases. Since such regulatory limits are established from the study results available at the time the standard was set, there is a continuing need to adjust such standards as more is learned from more refined studies. This is particularly true for the area's problem PM10 (and related PM2.5) for which (as noted in Attachment A), health impacts may be possible at exposure levels not identified in the past as capable of significant health impacts. Staff considers the proposed federal PM2.5 standard as potentially more effective in protecting against the effects of particulate matter than the existing PM10 standard. The present heightened concern about PM2.5 impacts has contributed to staff's focus on obtaining offsetting emission reductions in the immediate impact area.

As with other urban areas, many institutions and establishments with large numbers of sensitive receptors are found in the area around the proposed project. According to information from the applicant (Mirant 2000a, page 8.12-2), there are in this regard, 70 schools, 48 daycare centers, 22 hospitals or long-term care facilities, and 49 parks or recreation centers within a 3-mile radius of the project site. The presence of sensitive receptors does not mean that health effects would necessarily result from exposure to the pollutants in question. It rather means that the project's toxic emissions would be more likely to result in widespread health complaints if exposure were above applicable regulatory limits. The potential for such health complaints is assessed with specific regard for the limitations of the studies relied upon in the setting the applicable exposure standard. For Unit 7 and similar sources, the health effects of such air toxics are assessed separately according to their potential to induce cancer or effects other than cancer. If any potential health impacts were determined to be significant as discussed

below, staff would require additional mitigation to reduce the impacts to a level considered less than significant.

## **METHOD FOR ASSESSING THE CANCER AND NON-CANCER IMPACTS OF TOXIC AIR POLLUTANTS**

Any air toxics-related health risks from operating the proposed Unit 7 and similar projects would mainly be associated with emissions from their natural gas-fired combustion turbines. For the surrounding population, the risk of cancer or non-cancer effects is assessed from exposure estimates obtained from dispersion modeling. According to present knowledge, cancer is initiated by biological impacts at the genetic level, suggesting a specific (if theoretical) risk of initiation from every exposure to a carcinogen. (However, the risk of developing cancer is proportional to the length of the exposure.) It is after initiation that the risk of manifestation as the identifiable disease is considered. The aim of present regulation is to eliminate all such initiating and continuing exposures to the extent feasible for the source in question. This non-threshold concept is recognized as sharply contrasting with the concept about non-cancer effects, which are assumed to result only from exposure above specific levels, meaning that significant health impacts would be prevented by maintaining exposures below the applicable exposure standards. The procedure used for assessing such cancer and non-cancer impacts is known as a health risk assessment, which consists of the following steps:

- A hazard identification step in which each pollutant of concern is identified along with possible health effects;
- A dose-response assessment step in which the relation between the magnitude of exposure and the probability of effects is established;
- An exposure assessment step in which the possible extent of pollutant exposures from a project is established for all possible pathways by dispersion modeling; and
- A risk characterization step in which the nature and the magnitude of the possible human health risk is assessed.

### **Health Effects Assessed**

The types of air toxics-related health impacts of concern in this analysis are those that could result shortly after exposure or following long-term (or chronic) exposure. Those from short-term exposure are known as acute effects and generally result from exposure at relatively high levels. Some examples of air toxics-induced non-cancer health effects include headaches, dizziness, coughing, nausea, asthma, rash, and irritation of any part of the body such as the eyes, throat and skin.

For Unit 7 and other modern gas-fired facilities, high-level toxic exposures (at levels capable of acute effects) could occur only during major accidents, not during routine operations when emissions are much lower. Since acute health impacts are not commonly associated with routine operation of such facilities, effects from chronic exposures are considered of greater concern than acute effects in assessing the potential for significant human health impacts (although staff still addresses the potential for significant acute impacts). Compliance with Air District-mandated emission control technologies is reflected by the incremental cancer and non-cancer risk estimates calculated. Since these incremental risk estimates are calculated the same way for

gas-fired power plants, they can be used, despite underlying scientific uncertainties, to compare similar projects for compliance with the best emission control technologies as currently identified for statewide use by the ARB.

### **Estimating the risk of non-cancer effects**

The method used by regulatory agencies to quantify the likelihood of acute or chronic impacts of air toxics is the hazard index method. In the current assessment approach, a hazard index is calculated as a numerical representation of the likelihood of significant health impacts at the exposure levels expected for the source being considered. This index is calculated by dividing the exposure estimate by the applicable reference exposure level (REL). After calculating the hazard indices for the individual pollutants, these indices are added together for all those that affect the same part of the body or target organ, to obtain a total hazard index for the source. Total hazard indices of 1.0 or less are regarded as indicating a lack of potentially significant addition to the non-cancer effects being considered. An index of more than 1.0 would reflect a potential for such effects to occur.

### **Estimating the risk of cancer**

Since cancer is currently considered inducible from every exposure to a carcinogen (with manifestation resulting from longer-term exposure), staff and other regulatory agencies generally consider the risk of cancer induction and manifestation as more sensitive than the risk of non-cancer effects for assessing the environmental acceptability of the long-term presence of sources of both carcinogens and non-carcinogens. The risk of such induction and manifestation is assumed to increase with exposure duration, meaning for example, that the risk from life time exposure would be higher than the risk from short-term exposure. This sensitivity difference accounts for the prominence of theoretical cancer risk estimates in the environmental risk assessment process.

For any source of specific concern, one can estimate the risk of operations-related cancer by multiplying the projected exposure level by the potency factors for the individual carcinogens to be emitted. These potency factors are numerical values conservatively established to represent the cancer-causing potential of one carcinogen as compared to the others. After calculating these individual risk values, the risk assessor would add them together to obtain the total incremental cancer risk estimate from operating the project over a period conservatively assumed to span the 70-year lifetime of the average individual. Given the conservatism of both the assumed exposure duration and the other phases of this risk calculation process, these numerical estimates are regarded as only representing the upper bounds on the project-related cancer risk at issue. The actual risk will likely be lower and could indeed be zero. The significance of these estimates as indicators of a real cancer hazard is assessed according to specific evaluative criteria as discussed below.

### **STAFF'S SIGNIFICANCE CRITERIA**

Various state and federal agencies specify different cancer risk levels as levels of significance for specific action. For example, a risk of 10 in a million is mostly considered under the Air Toxics "Hot Spots" (AB 2588) and the Proposition 65 programs



as significant, and therefore, used as a threshold for public notification in cases of air toxics emissions from existing sources.

In the current regulatory practice, this assessment is conducted in two phases. In the first phase (which is the screening phase), risk calculations are made using conservative, simplifying assumptions, which tend to overestimate the risk. If the estimates from this screening-level analysis were below 10 in a million, staff would regard the suggested cancer risk as insignificant and not warranting further analysis for specific action. If the estimate were more than 10 in a million, a more refined analysis (using more situation-specific assumptions) might be necessary to assess the need for specific mitigation or recommendation against certification. In such a refined analysis, staff would recommend specific mitigation or non-certification only when the risk estimate is 10 in a million or more. This limit-based regulatory approach is intended to limit the rate of addition to the previously noted high (1 in 4, or 250,000 in a million) background cancer risk of the average individual. While the causes of some types of cancers are well known, the causes of most of human cancers remain largely unknown with the risk of manifestation increasing with the individual's age. What has become clearer to scientists, however, is that environmental pollutants are responsible for only a small fraction of human cancers in general. The South Coast Air Quality Management District (SCAQMD 2000, page 2) has noted this fraction in their publication as only about two percent of cancer cases.

For non-carcinogenic pollutants, staff considers significant health impacts to be unlikely from project operations when the total hazard index is 1.0 or less. If more than 1.0, staff would regard the related emissions as potentially significant from an environmental health perspective but would recommend specific mitigation only after considering the uncertainties in the assessment process.

## **IMPACTS**

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### **POTENTIAL IMPACTS OF PROJECT'S NON-CRITERIA POLLUTANTS**

The health impacts of Unit 7's air toxics of specific concern in this analysis can be assessed separately as construction-phase impacts and operational-phase impacts.

#### **Construction Phase Impacts**

Possible construction-phase health impacts, as noted by the applicant (Mirant 2000a, pages 8.1-4 through 8.1-7), are those from human exposure to (a) the windblown dust from site excavation, grading, and building demolitions, (b) emissions from construction-related equipment and vehicles and (c) contaminants in the soil and water. The dust-related impacts may derive from exposure to the dust itself as PM<sub>10</sub>, or exposure to the toxic contaminants adsorbed on to such dust. Another potentially significant impact is human exposure to contaminants in Bay sediments to be dredged up while building the water intake and discharge system for the proposed Unit 7 and the existing Unit 3. Such contaminant release could increase the amount of contaminants in the fish from the Bay if inadequately controlled. The related conditions of certification in the **Soil and Water Resources** section are intended to ensure such control.

Since the project site is in periodic violation of the state's short-term PM10 standard, construction-related fugitive dust and diesel vehicle emissions will likely contribute to the impacts of such violations, creating the potential for effects exacerbation in this 24-month construction period. While the dust-related impacts might be significant as a contributor to area's PM10 problem, diesel-related construction emissions could contribute significantly to the carcinogenic effects of specific concern in this analysis. Diesel exhaust has been established as a potent human carcinogen for which effective controls have been identified by the ARB for the different emission source categories within the state. Control measures for Unit 7's construction equipment are included in the applicant's Construction Mitigation Plan discussed in the **Air Quality** section with specific respect to criteria pollutants. Such category-specific mitigation should be adequate to minimize any construction-related cancer risk as intended by the ARB. The implementing conditions of certification are specified as **AQC-1** and **AQC-2** in the **Air Quality** section. Staff considers the other aspects of the applicant's Construction Mitigation Plan as adequate to minimize construction impacts even in light of the area's PM10 problem.

The applicant (Mirant 2001Seds2) conducted specific surveys to identify the nature and concentration of the contaminants to be encountered during project-related Bay dredging. The most important of these contaminants are poly-aromatic hydrocarbons (PAHs) and petroleum hydrocarbons whose concentrations were found to increase with sediment depth while decreasing with distance from the shore. Other types of toxic contaminants (such as mercury, pesticides, and dioxins) were identified from past agency surveys and remain the reason for existing health advisory from the state's Office of Environmental Health Hazard Assessment (OEHHA) on Bay fish consumption described earlier. These contaminants have been identified as originating from past or on-going industrial activities around the Bay together with inappropriate disposal practices, and vehicular emissions. Staff does not expect any releases of these types of contaminants from Unit 7 operations.

The applicant (Mirant 2001g and 2001h) recognizes the potential health and ecological hazards from disturbing such contaminants and proposes to minimize their dissemination into Bay waters by (a) relocating the project's water intake and discharge structures away from areas of relatively high concentrations, (b) erecting a silt screen around any excavation point to minimize water transport, (c) enclosing the excavated material within a dry cofferdam to prevent contaminant releases into the Bay, and (d) employing surface-level containment measures in cases of potential surface-water dissemination. Design and construction of the discharge structures were also modified to decrease the amount of dredging necessary. The applicant's proposal is detailed in their Site Mitigation Implementation Plan (SMIP) to be reviewed by the City and County of San Francisco Department of Health, and the California Department of Toxic Substances Control. The implementing conditions of certification are recommended in the **Soil and Water Resources** section with respect to Bay waters and contaminated on-site water.

Staff considers such measures adequate for the intended exposure minimization, which in turn would prevent any increases in fish contaminant levels. Given the low health risk from the dominant (inhalation) pathway that would apply (as discussed later), staff does

not expect Unit 7's air toxics of concern in this analysis to significantly contribute to existing levels in the Bay waters.

Due to PG&E's bankruptcy, the issue of their ability to continue remediation activities has been raised by various parties. In spite of its present financial difficulties, PG&E has reiterated its intention to comply with its existing legal obligation to remediate contamination created prior to Mirant's purchase of the property. PG&E has issued a letter stating that they have obtained an order from the United States Bankruptcy Court for the Northern District of California allowing them to continue certain hazardous substance remediation programs and procedures (PG&E 2001a). PG&E states that they will be continuing with the performance of their remediation obligations under applicable law. Additionally, staff recommend Condition of Certification **Waste-9** in the **Waste Management** section to ensure such compliance as a legal obligation. The applicant's Waste Management Plan for generated hazardous and non-hazardous wastes are also specified in the **Waste Management** section along with the implementing conditions for certification. Staff considers this plan as adequate protection against the contaminant impacts of concern.

### **Direct Operational Impacts**

The impacts of emitted air toxics tend to be highest in close proximity to their sources and quickly drop off with distance from them (South Coast AQMD 2000, page 6). This means that the levels of Unit 7's air toxics would be highest in the immediate area and decrease rapidly as one moves away from locations of maximum impact. One main focus of this analysis is to establish whether or not such exposures would be at levels of possible health significance as established using existing assessment methods.

The applicant's estimates of Unit 7's contribution to the area's cancer and non-cancer risks were obtained from a health risk assessment conducted according to procedures specified in the 1993 California Air Pollution Control Officer's Association (CAPCOA) guidelines. The pollutants of concern are those from the project's combustion turbines. The emission from facility cooling would be insignificant given the closed nature of the once-through system to be used.

The results from the applicant's risk assessment were provided to staff along with documentation of the assumptions used (Mirant 2000a, pages 8.6-2 through 8.6-9). Such documentation was provided with respect to the following:

- Pollutants considered;
- Emission levels assumed for the pollutants involved;
- Dispersion modeling used to estimate potential exposure levels;
- Exposure pathways considered;
- The cancer risk estimation process;
- Hazard index calculation; and
- Characterization of project-related risk estimates.

Staff has found these assumptions to be acceptable and have validated the applicant's findings with regard to the numerical public health risk estimates expressed either in terms of the hazard index for each non-carcinogenic pollutant, or a cancer risk for

estimated levels of the carcinogenic pollutants. These analyses were conducted to establish the maximum potential for acute and chronic effects on body systems such as the liver, central nervous system, the immune system, kidneys, the reproductive system, the skin and the respiratory system.

The following noncriteria pollutants were considered with respect to non-cancer effects: ammonia from the use of the selective catalytic reduction (SCR) system for NO<sub>x</sub> control, acetaldehyde, benzene, 1,3 butadiene; ethylbenzene, formaldehyde, hexane, naphthalene, polycyclic aromatic hydrocarbons (PAHs), propylene oxide, toluene, and xylenes. The following were considered with regard to a possible cancer risk: acetaldehyde, benzene, 1,3 butadiene, formaldehyde, PAHs and propylene oxide.

A maximum chronic hazard index of 0.1415 was calculated for the maximally exposed individual at a location within an industrial site near the northeastern facility boundary of Potrero PP. The maximum chronic hazard at the nearest sensitive receptor location (the Potrero Hill Recreation Center) was calculated as 0.023. A maximum acute hazard index of 0.5141 was calculated for the same Potrero Hill Recreation Center about one half-mile from the proposed project. Since these indices are well below the significance value of 1.0, they suggest that the project's toxic emissions would be unlikely to significantly add to the risk of immediate-onset or delayed non-cancer effects for any individual, either in the immediate project vicinity or any other neighborhoods around the project.

One source of uncertainty that should be noted in this health hazard analysis is the consideration of acrolein impacts in a qualitative rather than quantitative manner. This stems from the California Air Resources Board's April, 2000 advisory to limit the use of the previously used standard method (M430) for the determination of acrolein levels, and that any data or results based on that method are suspect and should be flagged as non-quantitative when they appear. Until such a method is approved by ARB, only a qualitative assessment can be made to assess the impacts of potential significance (eye irritation), which at the levels from Unit 7 and similar sources would be relatively insignificant for two reasons: (1) the nature of the health endpoint at issue (minor, reversible irritation) and (2) recent data showing relatively low levels of acrolein, based on revised test methods, at a similar natural gas-fired combined cycle plant. Further, after reviewing such data in the Metcalf case, the Commission required the use of an oxidation catalyst to mitigate any potential impacts from acrolein. An oxidation catalyst is included in the design of the proposed Unit 7 project. This means that any impact contribution from acrolein would be unlikely to alter staff's finding of less than significant with respect to non-cancer effects.

The highest combined cancer risk was estimated to be 0.658 in a million for an individual considered to be at the same industrial site where maximum chronic non-cancer impacts are projected to occur. This cancer risk was calculated using existing procedures in which (a) the individual at risk is conservatively assumed to be potentially exposed at the highest possible levels to all the carcinogenic pollutants from the project for a 70-year lifetime, (b) all the carcinogens are assumed to be equally potent in experimental animals and humans even when their cancer-inducing abilities have not been established in exposed humans, and (c) humans are assumed to be as sensitive as the most sensitive experimental animal despite knowledge that such cancer

potencies often differ between humans and experimental animals. Cancer-causing ability has been established in humans for only a relatively few of the many environmental chemicals identified so far as capable of cancer induction in experimental animals. This calculated risk value is significantly below staff's significance level of 10 in a million, meaning that the project's carcinogenic emissions would be unlikely to pose a significant cancer risk anywhere within the surrounding population.

If, as noted for perspective by the applicant (Mirant 2001a, p 8.6-7), the entire San Francisco population of 800,000 were to be exposed to Unit 7's carcinogens at their point of highest impact, every day of the year, for an entire 70-year lifetime, only a maximum of 0.53 cancers (obtained by multiplying the maximum lifetime individual cancer risk of 0.658 in a million by this population number) would result. This means that the project's operation would be unlikely to result in any new cancers within the entire population of San Francisco even under these hypothetical worst-case conditions. This, to staff, is the equivalent of a zero cancer risk in the project area, accounting for staff's conclusion that the proposed project would be unlikely to pose a significant risk to either the local residents or the residents further away from the plant. The most significant consideration for this case is that the carcinogenic emissions from the proposed use of natural gas would not be at levels likely to significantly add to any existing area cancer risk.

## POTENTIAL IMPACTS OF PROJECT CRITERIA POLLUTANTS

As previously noted in this analysis, the health impacts of criteria pollutants from Unit 7 and similar sources are avoided by maintaining exposures below applicable air quality standards. Staff's assessment in the **Air Quality** section has established the proposed control technology as potentially effective for maintaining Unit 7's criteria pollutants of concern within levels not violating the applicable standards themselves or together with existing area (background) levels. The only exception is the noted PM10 for which the project area is in periodic violation (with respect to the state's short-term standard). As noted in the **Air Quality** section, such violation has been recorded only six different times since 1995, and only during the problem winter or early fall period. However, these occasional violations have caused staff to regard any project-related impacts as warranting corresponding emission reductions to minimize the potential for continued above-standard exposures.

There are specific District rules for permitting new PM10 and other criteria pollutants in cases of existing air quality violations. As noted by the applicant (Mirant 2001DRespSAEJ) and discussed in the **Air Quality** section, the implementing requirements are specified (in District Regulation 2-2-233) in ways that maintain the new emissions below the District's significance criterion, which for PM10 is 5.0 ug/m<sup>3</sup> for a 24-hr averaging time. The maximum contribution from the project at any specific location was calculated as 2.9 ug/m<sup>3</sup>, which is significantly below this defining District criterion. Furthermore, the maximum impact location is in an uninhabited location near the project's property lines. The maximum (24-hour) impacts in the surrounding neighborhoods will be considerably less, mostly varying from less than 0.5 ug/m<sup>3</sup> to slightly more than 1.0 ug/m<sup>3</sup>. Further project-related additions are possible from (a) the noted secondary PM10 formation from the interactive effects of some of the project's other criteria pollutants, NO<sub>x</sub>, VOC, ammonia and sulfur oxides, and (b) the major

industrial sources identified in the **Air Quality** section as Potrero Units 3-6, Mission Valley Rock, Hunters Point Power Plant, and Southeast Water Treatment Plant. However, secondary PM10 formation takes time and will likely occur downwind away from the project area. Offsetting emission reductions will be made by the applicant to counteract the effects of this PM10 as required by the Air District. The issue of specific concern to area residents is that such sources of offsets are located away from the project vicinity (because of the relative lack of available offsets in the area).

Although the applicant's offsets procurement approach is in keeping with the District's policy, staff has sought additional reduction measures in the local area in keeping with staff's policy of minimizing impacts in the immediate project vicinity. The necessity for stringent PM10 mitigation (in spite of the relatively small Unit 7-related increments) is buttressed by the emerging doubts about the adequacy of existing standards as protection against the effects of PM10 and its related PM2.5, which (as noted in Attachment A), is beginning to be recognized as posing a health hazard at levels not associated with significant impacts in the past. Many area residents and participating health experts have pointed to many identifying study results in voicing concerns about the project's PM10 emissions. Staff acknowledges such concerns and recommends implementation of the PM10-specific mitigation measures recommended in the **Air Quality** section to possibly assure a net air quality benefit in the local area of maximum impact. This recommended focus on local, diesel-related emissions, would reduce the type of (diesel-related) PM10 posing a more serious health hazard to area residents than the natural gas-related emissions from project operations. The heightened concern about diesel exhaust exposure is due to its higher ground-level concentrations as mostly derived from vehicular sources as well as identification as a potent human carcinogen whose control has been given a high priority by the ARB with respect to vehicular and stationary sources.

## **CUMULATIVE IMPACTS OF AREA AIR TOXICS**

When toxic pollutants are emitted from multiple sources within a given area, the cumulative, or additive, impacts of such emissions could, in concept, lead to significant health impacts within the population, even when such pollutants are emitted at insignificant levels from the individual sources involved. Analyses of such emissions have shown, however, that the peak impacts of such toxic pollutants are normally localized within relatively short distances from the source. Given the low cancer and non-cancer risks from the project's toxic emissions, the project will not contribute significantly to any area toxic exposure of a cumulative nature. The cumulative impacts of criteria pollutants were assessed in the **Air Quality** section in establishing the extent of the needed offsets. The concern over maintaining Unit 7's carcinogen contribution within the assumed levels could be allayed by knowledge of Air District-required compliance with the previously noted requirements of the Health and Safety Code (AB 2588, or the Toxics "Hot Spots" bill). This bill (along with the implementing Toxic Air Contaminant Control Program) requires each project operator to assess the air toxics-related health risk from operations and use the results in assessing success at continued operations without a significant cancer risk. This approach has been successful for other carcinogen sources in the Air District.

## ENVIRONMENTAL JUSTICE

Economic and demographic analyses by the applicant (Mirant 2000a pages 8.8-1 through 8.8-11, and Appendix Q) and by staff identified specific locations with predominantly minority and low-income residents in the Potrero Hills, Bayview-Hunters Point and other neighborhoods around the project site. Details of residency patterns within these locations are provided in the **Socioeconomics** section. As noted earlier, these minority and low-income populations warrant special consideration because of their usually higher-than-normal incidence of asthma, bronchitis and other respiratory diseases that render them susceptible to the effects of air pollution. As noted by the applicant (Mirant 2001DResSAEJ2, Data Response N0. 12) for example, one study by the San Francisco Department of Health shows the 10 percent incidence of asthma among adults and 15.5 % among children in the Bayview-Hunters Point area as much higher than the rates in other large cities. The uncertainty in this finding relates to the use of a more permissive definition of asthma in these studies, thereby overestimating the actual prevalence. What remains clear, however, is that cases of asthma, bronchitis and other respiratory diseases are higher in such minority populations for reasons that are poorly understood. Health officials recognize the need to avoid exposure increases in such areas to the extent feasible.

The concern over environmental justice for the proposed project relates to the potential for disproportionate pollution impacts on these minority or low-income populations from (a) clustering pollutant sources around them or (b) employing less effective controls in operating such sources than would otherwise be used in other areas.

As discussed earlier in this analysis, any air toxics-related health impacts from Unit 7 operations would be less than significant in all areas around the project indicating a lack of significant impacts within all population groups in the area. This relative lack of impacts results from the use of the relatively clean-burning natural gas and controlling emissions using the best available control technology. The U.S. EPA's Final Guidance document (U.S. EPA, 1998) on environmental justice indicates that it is not the intent of the related Executive Order, or the Guidance itself, to change the legal thresholds for determining the significance of an impact. The intensity or severity of an impact is critical in determining whether environmental justice is an issue for a given project. Where the impact of a project is "not disproportionately high and adverse" that is, not "significant" as the term is used in both the National Environmental Policy Act and the California Environmental Policy Act, there is no additional environmental justice consideration for the project.

The site for the proposed project has a history of industrial activity dating back to the 1870s, explaining the presence of the utility infrastructure necessary for effective power production and distribution. Staff's recommendation for additional control of the area's PM10 is due to occasional violations of the very stringent state 24-hour PM10 standard. The project's own contribution to these occasional violations would be relatively small, thereby reflecting the use of Air District-specified Best Available Control Technology (or BACT). Compliance with the offset requirements in the **Air Quality** section should ensure the same types of controls the District requires for all areas, whether minority or non-minority.

## FACILITY CLOSURE

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As noted in the introduction section, the toxic pollutants of primary concern in this analysis are those from routine operation of the proposed project. During temporary or permanent closure, the main concern would be over the non-routine releases of hazardous materials or wastes on site. Such releases are discussed respectively in the **Hazardous Materials** and **Waste Management** sections. Since project operations would be stopped during forced temporary closures, any hazardous releases would not be in significant amounts. During permanent closure, the only emissions of potential significance would derive demolition or dismantling activities and the equipment used. Such emissions would be subject to controls according to requirements in conditions adopted by the Energy Commission after a closure plan is received from the project owner.

## RESPONSE TO PUBLIC AND AGENCY COMMENTS ON THE PSA

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### CITY AND COUNTY OF SAN FRANCISCO

**CCSF-3B:** *Points to staff's failure to address the potential impacts of PM2.5 in staff's project impact analysis.*

**Response:** Staff has included a discussion of potential PM2.5 impacts in Attachment A. Staff addressed the uncertainty in the present particulate control approach in light of present delay in implementing the new federal standard. Staff considers the proposed federal PM2.5 standard as scientifically sound and potentially more effective than the existing PM10 standard in protecting against the particulate effects of health concern. As shown in the **Air Quality** section, particulate measurements at the proposed project site show the area's PM2.5 levels to be lower than the new federal standard, meaning that the area would be in compliance with this standard when it begins to be implemented by the U.S. EPA. Since, PM2.5 is emitted from the combustion sources (such as vehicle engines) that are the focus of staff's recommendations for additional mitigation at the local level, staff considers the proposed mitigation approach as an effective counterbalance against any PM 2.5 contributions from the proposed gas-fired project.

**CCSF-3C:** *Addresses the lack of discussion of SO2 from construction equipment.*

**Response:** As discussed in the **Air Quality** section, staff's recommended construction mitigation should be adequate for the emission minimization considered adequate on a statewide basis for the construction source categories identified for SO2 and the other criteria pollutants.

**CCSF-3 D:** *Addresses the potential impacts of construction-related diesel emissions and the need for specific mitigation.*

**Response:** Staff has emphasized the carcinogenic potential of diesel emissions in stressing the need for rigorous construction-related mitigation. The ARB has identified the Best Available Control Measures (BACM) for the different source categories



associated with project constructions. These source-specific measures are intended to minimize the cancer and non-cancer health risk of concern. These source-specific control measures are included in the applicant's Construction Mitigation Plan detailed in the **Air Quality** section (under Conditions of Certification **AQC-1** and **AQC-2**) for Unit 7's construction emissions. Staff considers compliance with these mitigation requirements as adequate protection against the cancer and non-cancer impacts of concern.

**CCSF-E:** *Addresses the potential for significant impacts from PM10 and SO2 emissions in the construction phase together with the need for specific mitigation.*

**Response:** Staff recognizes the potential significance of construction PM10 and SO2 emissions in the project construction phase but considers the proposed source category-specific emission mitigation plan (as detailed in the **Air Quality** section under the noted **AQC-1** and **AQC-2**) as adequate for compliance with the best available mitigation approach currently identified by the ARB and the Air District for the proposed and similar construction activities.

**CCSF-3F:** *Point to the need to specifically address the project's potential contribution to the greenhouse gas effect from the emission of methane and CO2.*

**Response:** While the world's greenhouse gas problem should be considered in assessing the potential impacts of any given source of the gases involved, present understanding does not allow for the type of source-specific quantification implied in the comment for the proposed and similar projects. The present staff policy is to ensure maximum generation efficiency as a way to avoid all avoidable electricity generation-related emissions in the face of continued growth in population demand for electrical power. The electricity generation equipment for Unit 7 is specified to maximize efficiency, thereby minimizing the level of greenhouse gas to be emitted per unit of utilized fuel. This means that much lower amounts of greenhouse gases would be generated than if the less efficient area power generators were used to generate the amount of electricity to be generated by Unit 7. Such emission minimization (per unit generated) is the essential element of an effective greenhouse gas policy.

**CCSF-3G:** *Considers the cumulative impacts discussion as inadequate.*

**Response:** project's emissions would be localized, thereby minimizing the potential for the impact overlap necessary for cumulative exposure. The purpose of cumulative impact analyses for toxic air pollutants (with no air quality standards) is to minimize their incremental additions from new sources. The contributions from the existing Units 3-6 and other area sources are part of the background air toxics whose levels are monitored under the Air District's Toxic Air Contaminant Control Program. It is from such monitoring that the Air District (a) identifies sources posing a significant cancer risk, (b) establishes the need for specific mitigation, and (c) assesses the effectiveness of applied controls. No one source is currently identified from this District program as posing a risk of potential significance as defined under existing District rules. Any cancer risk from these background air toxics would be part of the background 1 in 4 cancer risk of the average individual. The need to prevent significant additions to this

background human cancer risk is the driving force behind current carcinogen control approaches. Maintaining Unit 7's potential contribution below levels of potential significance (as reflected by the low level of the calculated cancer risk) is in keeping with this control approach.

**CCSF-3J:** *Considers the emission from construction of the project's transmission line to the Hunters Point Substation as inadequately addressed.*

**Response:** The source-specific controls for all project-related construction equipment is intended by staff to be applied to both the facility and its related transmission lines. Details of these emission controls are provided in the **Air Quality** section as affective against the cancer and non-cancer impacts of statewide concern for such construction activities.

**CCSF-3L:** *Points to the inadequacy of staff's recommended PM10 mitigation and potential inability to ensure that any related air quality gains would be maintained for the rest of the project's operational life.*

**Response:** As noted in this analysis, staff is recommending additional mitigation at the local level to minimize any project related impacts. The details of the bus-related diesel retrofit implementing measures are presented in the **Air Quality** section. Since stringent emission limits will be required by CARB for all new diesel engines in the near future (by about 2006), staff's recommendation to retrofit area school buses effectively reduces PM10 levels from existing higher-emitting buses at an earlier date. The resulting air quality gains will be maintained in the local area as the less emitting new diesel vehicles continue to replace the existing higher-emitting ones on a statewide basis. Staff's recommended mitigation is best viewed as an effort to accelerate the reduction of diesel emissions in the project area, with resulting earlier health benefits. Similar emission reductions will begin to occur in other area's of the state with the CARB-mandated emission reductions for all new diesel vehicles.

**CCSF-3N:** *Requests staff to recommend that the applicant be required to fund the operation of an air quality monitoring station in the Southeast San Francisco to continuously monitor local air quality.*

**Response:** As discussed more fully in the **Air Quality** section "Response to Public and Agency Comments," staff believes that the existing station adequately portrays the local area's air quality. Staff also does not agree that new monitoring data can be used as a baseline to monitor Unit 7's operation due to the influence of yearly weather patterns and the lack of any assurance that a single baseline year may adequately represent ambient conditions.

**CCSF-9A:** *States that staff should consider the potential impact of criteria air pollutants (specifically PM10) when assessing non-cancer project-related impacts.*

**Response:** Staff has addressed the non-cancer impacts of the proposed Unit 7 as necessary to establish the need for specific mitigation. Staff's analyses were conducted separately for the criteria pollutants and the toxic air contaminants, but did take into

account the health effects of each. Based on worst-case impacts of project PM10 emissions, **Air Quality** staff has recommended that all PM10 impacts be mitigated through emission offsets. Thus, there should be no net health related impacts from project PM10 emissions.

**CCSF-9B:** *Points to staff's failure to specifically address PM2.5 impacts.*

**Response:** Staff has addressed the health impacts of PM 2.5 above, and in **Attachment A** of this Public Health section, to show that Unit 7 operations will not result in a violation of the new federal standard, which staff regards as potentially more effective than the existing PM10 standard in protecting against the health effects of particulate matter.

**CCSF-14C(iv):** *Contends that air emissions are a major source of dioxins and furans which subsequently become a water quality problem.*

**Response:** The combustion of natural gas does not produce dioxins or furans.

**CCSF-14G(ii):** *Expresses concern about high concentrations of polycyclic aromatic hydrocarbons in soil and sediments and the potential for migration during construction and operation.*

**Response:** As described in the **Waste Management** and **Soils and Water Resources** sections, the location of the intake and discharge structures has been changed to an area with much lower sediment contamination. Additionally, the design of the discharge pipes has been altered, requiring the disturbance of significantly less sediment. Mirant will be required to prepare site mitigation plans designed to protect human health and the environment.

## **PIER 70 CITIZENS ADVISORY GROUP (P70)**

**P70-2B:** Mitigation for dredging of contaminants an excavation of contaminated soil should include funding for research and scholarships.

**Response:** Comment noted.

**P70-3:** Emissions mitigation should include closure of hunters point power plant, conversion of Potrero [Unit 3] to clean fuels, and decommissioning of existing Potrero Units 4, 5 and 6.

**Response:** The Energy Commission does not have jurisdiction over these other units.

## **POTRERO POWER PLANT CITIZENS ADVISORY TASK FORCE (PTF)**

**PTF-1:** *Asserts that air quality impacts have not been fully addressed or properly mitigated since attainment is too lax a standard, questions the adequacy of the diesel bus mitigation proposed, suggests that ammonia emissions would be an annoyance, and that carbon dioxide emissions contributing to global warming could impact the community and should be mitigated.*

**Response:** Ambient air quality standards are health-based and designed to protect sensitive members of the public with a margin of safety. Nonetheless, air quality staff will require emissions of criteria pollutants to be offset so that there is no net increase. The exception is carbon monoxide, whose impacts are very low and existing ambient levels are well below applicable standards. The diesel bus mitigation is designed to accelerate the health benefits of cleaner diesel by providing for earlier retrofits than might otherwise occur. New diesel engine standards only apply to new vehicles, so a significant amount of time may elapse before substantial numbers of cleaner engines make it into the existing fleet. Ammonia emissions were considered in the public health analysis and found to be at levels which would not result in any adverse health effects to anyone. Please see staff's response to CCSF-3F above in reference to global warming.

## **DEBORAH BARON (DB)**

**DB-1:** Please see **CCSF-9B** above.

**DB-3:** *Contends that staff's proposed diesel-retrofitting mitigation would be inadequate.*

**Response:** Staff notes that the applicant's proposed mitigation for the PM10 in question would be adequate according to Air District requirements for Unit 7 and similar sources. Staff's recommended mitigation would be over and above these Air District requirements and are intended for maximum reduction in the local area of specific concern. Since the state will require more stringent controls for new diesel engines in the future, the air quality gains from staff's recommendations is expected to be maintained throughout the project's operational life. Staff would also note that the local bus-related diesel emissions to be mitigated are known human carcinogens that pose a much higher cancer risk to area residents than any of the gas combustion-related carcinogens to be emitted from Unit 7. These diesel emissions are also emitted at ground level where their impacts would be more localized than those from similar emissions from the project's stacks, which would be dispersed over a much larger area.

**DB-4:** *Regarding staff's workshop notation that a project such as Unit 7 would be constructed with the best available control technology (to maintain emissions within regulatory limits) whether intended for the desert or a major population center.*

**Response:** Any staff statement about project location was intended only to emphasize that the best emission control technology would be required for a project, regardless of its proposed location. The urban location of the proposed project is an important reason for staff's effort to maximize offsetting pollution reductions in the local area of impacts.

## **DEPARTMENT OF TOXIC SUBSTANCES CONTROL**

**DTSC-1:** *Notes that the location of the intake structure and diffuser pipelines has been modified and the amount of dredging proposed has been greatly reduced, so that their regarding the potential for dredging to expose sediments containing higher concentrations are addressed.*

**Response:** Comment noted here and in the **Waste Management** section **Project Specific Impacts – Offshore Activities**.

**DTSC-6:** *Notes that due to PG&E's bankruptcy, it is unclear whether they will be able to fulfill the responsibilities outlined in the PSA. DTSC recommends that the FSA contain a requirement that the project owner be responsible for ensuring that these activities are completed, whether by PG&E or themselves.*

**Response:** PG&E has obtained an order from the United States Bankruptcy Court for the Northern District of California allowing it to continue certain hazardous substance remediation programs and procedures and that it will be continuing with the performance of its remediation obligations under applicable law. However, to be sure that project-related remediation proceeds regardless of future circumstances, staff's proposed Condition of Certification **WASTE-9** requires the project owner to ensure that such activities are completed.

**DTSC-7:** *The construction phase section should be revised to be consistent with the Site Mitigation and Implementation Plan.*

**Response:** Comment noted and change made.

## **FRANCIS J. CLAUSS (FC)**

**FC-1:** *Notes the presence of major industrial sources of air pollution in arguing against major new sources in the area.*

**Response:** Staff's analysis was conducted to ensure that any pollution from the proposed Unit 7 would not contribute significantly to any existing levels as derived from industrial and non-industrial sources in the project area. This increment minimization approach is employed by all Air Districts together with specific offset requirements to ensure acceptable air quality in the face of necessary industrial development in any given area. Staff's recommended mitigation, in the case of the problem PM10, would be over and above the Air District's requirements for sources such as Unit 7.

## **SAN FRANCISCO BAYKEEPER**

**SFBK-1B:** *Neither staff nor the applicant has not (sic) completed an evaluation of ecological risk posed by disturbing contaminated sediments resulting from dredging.*

**Response:** The intake and discharge structures have been moved to new locations that are less impacted by contamination. In addition, construction of the intake structure will take place within a silt curtain and cofferdam, and the design of the discharge pipes has been modified to require less dredging and provide a cap over the sediment.

## **GOLDEN GATE AUDUBON SOCIETY (AUD)**

**AUD-11:** *"...airborne pollutants also enter our aquatic food chain as they are wind-deposited into the Bay. This plant will therefore have impacts on those who depend on near shore fisheries for subsistence living. You should analyze the potential health impacts from these airborne particulates, the impacts to fisheries from airborne contaminants released from the plant that settle into the Bay and the health impacts to fisherpeople who consume those fish."*

**Response:** First, all particulate matter emissions from the project are required to be mitigated, either in the form of Emission reduction credits, or local mitigation proposed by Energy Commission staff. Thus, no health effects are anticipated. Second, humans are assumed to be the most sensitive species and, since noninhalation pathways are not found to be significant in people (these pathways include eating fish and drinking water), the fish would not be at risk either. Third, the health risk assessment found all health impacts to be less than significant. The inhalation pathway is the dominant (most important) pathway, and accounts for the greatest portion of potential health impacts. Since there are no significant risks associated with this pathway, it follows that risks from all other pathways, including eating fish, are also less than significant.

## **FORM LETTERS TO THE COMMITTEE (FL)**

**FL-1A:** See FC-1 above.

**FL-1B:** *Addresses the closeness of schools and residential areas in arguing against the project's location as proposed.*

**Response:** As noted in this analysis, the potential for significant (Unit 7-related) health impacts was assessed using exposure standards established to protect against health effects in sensitive individuals such as school children and residents with asthma, bronchitis and other respiratory diseases. Staff does not expect significant impacts on such individuals from the use of the best emission control technology for the project together with the emission offsets to be focused on local impacts.

**FL-1C:** *Regarding the potential release of 625 tons of air pollution and 110 tons of soot for the 40-year operational life of the project.*

**Response:** The potential air quality impacts of emissions at such levels were established through the modeling procedures established for use on a statewide basis. The need for specific mitigation was established from such air impact modeling.

## **GAIL MALLIMSON (GM)**

**GM-1:** See CCSF-3F above.

**GM-2:** *Point to the need to avoid building power plants without state-of-the-art emission control technologies.*

**Response:** Staff would agree with this sentiment in noting that Unit 7 proposes to utilize best available power generation and emission control technologies as currently identified by the CARB (and noted at length in the **Air Quality** section).

**GM-3:** *Recommends that future medical costs to area residents be considered.*

**Response:** Staff expects the health assessment and educational efforts of the San Francisco Health Department to continue in the project area as part of the Department's existing disease prevention program. Staff considers the proposed emission controls

and offsets as adequate to prevent any increase in the health effects associated with area hospitalizations.

### **CARTER PAYNE (CP)**

**CP-3:** *Points to staff's failure to adequately acknowledge the project's potential impacts together with the need for specific mitigation.*

**Response:** Staff has assessed the project's criteria pollutants for their potential to significantly worsen any existing air quality violations, or cause new violations of existing standards. It is from such analysis that staff identified the need for the mitigation measures specified in the **Air Quality** section with respect to the area's problem ozone and PM10. The recommended mitigation measures are in keeping with staff's policy of maximizing the offsets-related air quality gains in the immediate project area. Staff's analysis also showed the project's air toxics levels to be potentially less than significant with respect to health effects. Staff considers such findings of insignificance as reflecting a potential for operation using the best available control technology as required by the CARB.

### **KAREN PIERCE (KP)**

**KP-1, 2 and 3:** See **CP-3** above.

**KP-4:** See **DB-3** above.

### **POTRERO TASK FORCE (PTF)**

**PTF-1:** See **CP-3** above.

### **KIM ROOKER (KR)**

**KR-2:** See **CP-3** above.

### **DIANA SCOTT (FROM AN E-MAIL SENT BY J. SCHECHTER)**

**DS-1:** See **CCSF-3L** and **CCSF-9B** above.

### **ALISON SHORE (AS)**

**AS-2:** See **CP-3** above.

### **MARK STOUT (MS)**

**MS-1:** *Regards the environmental justice aspects of the proposed facility as significant.*

**Response:** Staff acknowledges the proposed project site is within an area with predominantly minority residents. As noted in this analysis, however, the reasons for this choice of location have been presented by the applicant to show the project as an expansion of an existing power plant in a location currently dedicated to energy production. Staff considers the combination of best available emission control technology and maximal emission offsets as adequate to prevent the plant's operation from significantly adding to the pollution levels in the project area. Additionally, the diesel mitigation proposed by staff should provide local public health benefits. The

emission controls required by the Air District in combination with the proposed mitigation will ensure that there are no adverse significant public health impacts. Thus, staff has found that there are no environmental justice issues related to public health.

### **CHRIS WEEKS (CW)**

**CW-1:** See **GM-2** above.

### **JACKIE WILLIAMS (JW)**

**JW-1:** See **CP-3** above.

## **CONCLUSIONS AND RECOMMENDATIONS**

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### **CONCLUSIONS**

The construction and operation of the proposed natural gas-burning Unit 7 project will not significantly impact the health status of the surrounding population with respect to the toxic pollutants considered. The conditions for ensuring compliance with all applicable air quality standards have been specified in the **Air Quality** section for the area's problem criteria pollutants. Staff is concerned about the potential for adding PM10 to this area of existing violations. However, (a) the relatively small level of the project-related additions and (b) the **Air Quality** staff's recommendation for (vehicle-related) emission offsets at the local level, should allow for operations without significant impacts on the population health status.

### **RECOMMENDATIONS**

The project's cancer and non-cancer risks would be at levels reflecting controls with technology established by the ARB as most effective for this and similar facilities. Therefore, staff finds the proposed operational plan to be acceptable with respect to the air toxics impacts considered. The potential impacts from construction-related toxic exposures should be minimized through compliance with related conditions in the **Air Quality, Soil and Water Resources, and Waste Management** sections. No specific **Public Health** Conditions of Certification are recommended. Recommendations on the project's criteria pollutants are presented in the **Air Quality** section.

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## ATTACHMENT A - CRITERIA POLLUTANTS

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### OZONE (O<sub>3</sub>)

Ozone is not directly emitted from specific sources but is formed when reactive organic compounds (VOCs) interact with nitrogen oxides in the presence of sunlight. Heat speeds up the reaction, typically leading to higher concentrations in the relatively hot summer months. Ozone is a colorless, reactive gas with oxidative properties that allow for tissue damage in the exposed individual. The effects of such damage could be experienced as respiratory irritation that could interfere with normal respiratory function. Ozone can also damage plants and other materials susceptible to oxidative damage.

The U.S. EPA revised its federal ozone standard on July 18, 1997 (62 Fed. Reg. 38856), based on health studies that had become available since the standard was last revised in 1979. These new studies showed that adverse health effects could occur at ambient concentrations much lower than reflected in the previous standard, which was based on acute health effects experienced during heavy exercise. In proposing the new standard, the EPA identified specific health effects known to have been caused by short-term exposures (of one to three hours) and prolonged exposure (of six to eight hours) (61 Fed. Reg. 65719). However, a 1999 federal court ruling blocked implementation of the ozone 8-hour standard, which is yet to be implemented.

Acute health effects from short-term exposures include a transient reduction in pulmonary function, and transient respiratory symptoms including cough, throat irritation, chest pain, nausea, and shortness of breath with associated effects on exercise performance. Other health effects of short-term or prolonged O<sub>3</sub> exposures include increased airway responsiveness (which predisposes the individual to bronchoconstriction induced by external stimuli such as pollen and dust), susceptibility to respiratory infection (through impairment of lung defense mechanisms), increased hospital admissions and emergency room visits, and transient pulmonary inflammation.

Generally, groups considered especially sensitive to the effects of air pollution include persons with existing respiratory diseases, children, pregnant women, and the elderly. However, controlled exposure data on people in clinical settings have indicated that the population at greatest risk of acute effects from ozone exposures as children and adults engaged in physical exercise. Children are most at risk because they are active outside, playing and exercising, during summer when ozone levels are highest. Adults who are outdoors and engaging in heavy exertion in the summer months are also among the individuals most at risk. This happens because such exertion increases the amount of O<sub>3</sub> entering the airways and can cause O<sub>3</sub> to penetrate to peripheral regions of the lung where lung tissue is more likely to be damaged. These individuals, as well as those with respiratory illnesses, such as asthma, can experience a reduction in lung function and increased respiratory symptoms, such as chest pain and cough, when exposed to relatively low ozone levels during periods of moderate exertion.

## **CARBON MONOXIDE (CO)**

Carbon monoxide is a colorless, odorless gas, which is a product of inefficient combustion. It does not persist in the atmosphere, being quickly converted to carbon dioxide. However, it can reach high levels in localized areas, or "hot spots".

CO reduces the oxygen carrying capacity of the blood, thereby disrupting the delivery of oxygen to the body's organs and tissues. Persons sensitive to the effects of carbon monoxide include those whose oxygen supply or delivery is already compromised. Thus, groups potentially at risk to carbon monoxide exposure include persons with coronary artery disease, congestive heart failure, obstructive lung disease, vascular disease, and anemia, the elderly, newborn infants, and fetuses (CARB 1989, p. 9). In particular, people with coronary artery disease were found to be especially at risk from carbon monoxide exposure (CARB 1989, p. 9). Tests conducted on patients with confirmed coronary artery disease indicated that exposure to low levels of carbon monoxide during exercise can produce significant cardiac effects. These effects include chest pain (angina) and electrocardiographic changes indicative of effects on the heart muscle (CARB 1989, p. 6). Such changes can limit the ability of patients with coronary artery disease to exert themselves even moderately. Therefore, the statewide carbon monoxide one-hour and eight-hour standards were adopted in part to prevent aggravation of chest pain. Additionally, however, the standards are intended to prevent decreased exercise tolerance in persons with peripheral vascular disease and lung disease, impaired central nervous system functions, and effects on the fetus (Cal. Code Regs. Tit. 17, §70200).

## **PARTICULATE MATTER (PM)**

Particulate matter is a generic term for particles of various substances, which occur as either liquid droplets or small solids of a wide range of sizes. Particles with the most potential to adversely affect human health are those less than 10 micrometers (millionths of a meter) in diameter (or PM<sub>10</sub>), which may be inhaled and deposited within the deep portions of the lung (PM<sub>10</sub>). PM may originate from anthropogenic or natural sources such as stationary or mobile combustion sources or windblown dust. Particles may be emitted directly to the atmosphere or result from the physical and chemical transformation of gaseous emissions such as sulfur oxides, nitrogen oxides, and volatile organic compounds. PM<sub>10</sub> may be made up of elements such as carbon, lead, and nickel; compounds such as nitrates, organics, and sulfates; and complex mixtures such as diesel exhaust and soil fragments. The size, chemical composition, and concentration of ambient PM<sub>10</sub> can vary considerably from area to area and from season to season within the same area.

PM<sub>10</sub> can be grouped into two general sizes of particles, fine and coarse, which differ in formation mechanisms, chemical composition, sources, and potential health effects. Fine-mode particles are those with a diameter of 2.5 micrometers or less (PM<sub>2.5</sub>), while the coarse-mode fraction of PM consists of particles ranging from 10 micrometers down to 2.5 micrometers in diameter. A 1999 federal court ruling blocked implementation of these standards, which is yet to be implemented.

PM<sub>2.5</sub> is derived both from combustion by-products, which have volatilized and condensed to form primary PM<sub>2.5</sub> and from precursor gases reacting in the atmosphere

to form secondary PM<sub>2.5</sub>. Components include nitrates, organic compounds, sulfates, ammonium compounds, and trace elements (including metals) as well as elemental carbon such as soot. Major sources of PM<sub>2.5</sub> are fossil fuel combustion by electric utilities, industry and motor vehicles, vegetation burning, wood smoke, and the smelting or other processing of metals. Dry deposition of fine mode particles is slow allowing such particles to often exist for long periods of time (of from days to weeks) in the atmosphere and travel hundreds to thousands of kilometers. They tend to be uniformly distributed over urban areas and larger regions and are removed from the atmosphere primarily by forming cloud droplets and falling out within raindrops.

Coarse-mode PM<sub>10</sub> is formed by crushing, grinding, and abrasion of surfaces, and in the course of reducing large pieces of materials to smaller pieces. Coarse particles consist mainly of soil dust containing oxides of silicon, aluminum, calcium, and iron; as well as fly ash, particles from tires, pollen, spores, and plant and insect fragments. Coarse particles normally have shorter lifetimes (minutes to hours) and only travel over short distances (of less than tens of kilometers). They tend to be unevenly distributed across urban areas and have more localized effects than the finer particles.

The health effects of PM<sub>10</sub> from any given source usually depend on the toxicity of its constituent pollutants. The size of the inhaled material usually determines where in the respiratory it is deposited. Coarse particles are deposited most readily in the nose and throat area while the finer particles are more likely to be deposited within the bronchial tubes and air sacs, with the greatest percentage deposited in the air sacs. Particles deposited in the air sacs are removed more slowly by the body's particulate defense system than those deposited in the nose and throat area. Deposition in the air sacs allows for the longer residence time necessary for impacts of potential health significance.

Many epidemiological studies have shown exposure to particulate matter as capable of a variety of health effects, including premature death, aggravation of respiratory and cardiovascular disease, changes in lung function and increases in existing respiratory symptoms, effects on lung tissue structure, and impacts on the body's respiratory defense mechanisms. The underlying biological mechanisms are still poorly understood. Based on their review of a number of these epidemiological studies (as published after 1987 when the federal standards were last revised), together with suggestion of PM<sub>2.5</sub> concentrations as a more reliable surrogate for the health impacts of the finer fraction of PM than PM<sub>10</sub>, EPA concluded that the then-current standards were not sufficiently stringent to protect against significant effects in exposed humans. Therefore, federal PM standards were revised on July 18, 1997 (62 Fed. Reg. 38652) to add new, annual and 24-hour PM<sub>2.5</sub> standards to the existing annual and 24-hour PM<sub>10</sub> standards. Taken together, these new standards were meant to provide additional protection against a wide range of PM-related health effects, including premature death, increased hospital admissions and emergency room visits, primarily among sensitive individuals such as the elderly, children and individuals with cardiopulmonary diseases such as asthma. Other impacts include decreased lung function (particularly in children and asthmatics), and alterations in lung tissue and structure.

California has 24-hour and annual standards for only PM<sub>10</sub> are based on symptoms observed at the lowest concentrations used in human studies (CARB 1982, pp. 81,84). These studies were aimed at establishing the PM<sub>10</sub> levels capable of inducing asthma, premature death and bronchitis-related symptoms. They were set to protect against such impacts in the general population as well as sensitive individuals such as patients with respiratory disease, declines in pulmonary function, especially as related to children (Cal. Code Regs. Tit. 17, §70200). These standard was set to be more stringent than the federal standard, which the ARB regards as inadequate for the protection desired (CARB 1991, p. 26).

The annual standard is based on studies showing long-term exposure to PM<sub>10</sub> as capable of decreasing breathing capability and increasing respiratory illnesses among susceptible individuals, especially children (CARB 1991, p. 25). The annual standard is also set to also accommodate the need for protection against any carcinogenic effects of PM<sub>10</sub> (CARB 1982, p. 84).

## **NITROGEN DIOXIDE (NO<sub>2</sub>)**

Nitrogen dioxide is formed either directly or indirectly when oxygen and nitrogen in the air combine together during the combustion. It is a relatively insoluble gas, which can penetrate deep into the lungs, its principal site of toxicity. Its toxicity is thought to be due to its capacity to initiate free radical-mediated reactions while oxidizing cellular proteins and other biomolecules (CARB 1992, Appendix A, p. 4).

Sub lethal exposures in animals usually produce inflammations and varying degrees of tissue injury characteristic of oxidant damage (Evans in CARB 1992, Appendix A, and p 5). The changes produced by low-level acute or sub chronic exposures appear to be reversible when the animal study subject is allowed to recover in clean air.

Health effects of particular concern in relation to low-level nitrogen dioxide exposure include: (1) effects of acute exposure on some asthmatics and possibly on some persons with chronic bronchitis, (2) effects on respiratory tract defenses against infection, (3) effects on the immune system, (4) initiation or facilitation of the development of chronic lung disease, and (5) interaction with other pollutants (CARB 1992, Appendix A, p. 5).

Several groups, which may be especially susceptible to nitrogen dioxide-related health effects have been identified from human studies (CARB 1992, Appendix A, and p. 3). These include asthmatics, persons with chronic bronchitis, infants and young children, cystic fibrosis and cancer patients, people with immune deficiencies, and the elderly.

Studies involving brief, controlled exposures on sensitive individuals have shown an increase in bronchial reactivity or airway responsiveness of some asthmatics, as well as decreased lung function in some patients with chronic obstructive lung disease (CARB 1992, Appendix A, p. 2). In general, bronchial hyper reactivity (an increased tendency of the airways to constrict) is markedly greater in asthmatics than in non-asthmatics upon exposure to initiating respiratory irritants (CARB 1992a, p. 107). At exposure concentrations of specific relevance to the current one-hour ambient standard, there

appears to be little, if any, effect on respiratory symptoms of asthmatics (CARB 1992a, p. 108).

## **SULFUR DIOXIDE (SO<sub>2</sub>)**

Sulfur dioxide is formed when any sulfur-containing fuel is burned. SO<sub>2</sub> is highly soluble and consequently absorbed in the moist passages of the upper respiratory system. Exposure to sulfur dioxide can lead to changes in lung cell structure and function that adversely affect a major lung defense mechanism known as muco-ciliary transport. This mechanism functions by trapping particles in mucus in the lung and sweeping them out via the cilia (fine hair-like structures) also in the lung. Slowed mucociliary transport is frequently associated with chronic bronchitis.

Exposure to sulfur dioxide can produce both short- and long-term health effects. Therefore, California has established sulfur dioxide standards to reflect both short- and long-term exposure concerns. Based on controlled exposure studies of human volunteers, investigators have found that asthmatics comprise the group most susceptible to adverse health effects from exposure to sulfur dioxide (CARB 1994, p. V-1).

The primary short-term effect is bronchoconstriction, a narrowing of the airways, which results in labored breathing, wheezing, and coughing. The short-term (one-hour) standard is based on bronchoconstriction and associated symptoms (such as wheezing and shortness of breath) in asthmatics and is designed to protect against adverse effects from five to ten minute exposures. In the opinion of the California Office of Environmental Health Hazard Assessment, the short-term ambient standard is likely to afford adequate protection to asthmatics engaged in short periods of vigorous activity (CARB 1994, Appendix A, p. 16).

Longer-term exposure is associated with increased incidence of respiratory symptoms (such as coughing and wheezing) or respiratory disease, decreases in pulmonary function, and an increased risk of premature mortality (CARB 1991a, p. 12). The long-term (24-hour) standard is based upon increased incidence of respiratory disease and premature mortality. The standard includes a margin of safety based on epidemiological studies, which have shown adverse respiratory effects at levels slightly above the standard. Some of the studies indicate a sulfur dioxide threshold for effects, suggesting that no significant effects are expected from exposures to concentrations at the state standard (Ibid.).

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# **SOCIOECONOMIC RESOURCES**

Testimony of Michael Fajans and Amanda Stennick

## **INTRODUCTION**

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The technical area of Socioeconomics includes several related areas of interest and concern. A typical socioeconomic impact analysis evaluates the effects of short-term and long-term project-related population changes on housing, employment, local schools, medical and protective services, as well as the fiscal and physical capability of local governmental agencies to meet the needs of project-related changes in population. The socioeconomic analysis also provides demographic data for use in various other technical area analyses to determine the potential for environmental justice impacts as well as consideration of whether the project causes significant adverse socioeconomic impacts to low-income or minority populations.

## **LAWS, ORDINANCES, REGULATIONS, AND STANDARDS (LORS)**

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### **FEDERAL**

Executive Order 12898, "Federal Actions to address Environmental Justice (EJ) in Minority Populations and Low-Income Populations," focuses federal attention on the environment and human health conditions of minority communities and calls on federal agencies to achieve environmental justice as part of this mission. The order requires the U.S. Environmental Protection Agency (USEPA) and all other federal agencies (as well as state agencies receiving federal funds) to develop strategies to address this issue. The agencies are required to identify and address any disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority and/or low-income populations.

Civil Rights Act of 1964, Public Law 88-352, 78 Stat.241 (Codified as amended in scattered sections of 42 U.S.C.) Title VI of the Civil Rights Act prohibits discrimination on the basis of race, color, or national programs in all programs or activities receiving federal financial assistance.

### **STATE**

#### **Title 14 California Code of Regulations, Section 15131**

- Economic or social factors of a project may be used to determine the significance of physical changes caused by the project.
- Economic, social and particularly housing factors shall be considered by public agencies together with technological and environmental factors in deciding whether changes in a project are feasible to reduce and or avoid the significant effects on the environment.

#### **CALIFORNIA GOVERNMENT CODE, SECTION 65995-65997**

SB 50 and other statutory amendments enacted in 1998 provide that, notwithstanding any other provisions of local or state law (including CEQA), state and local agencies



may not require mitigation for the development of real property for effects on school enrollment except as provided by Government Code Section 65996(a). The relevant provisions restrict fees for the development of commercial and industrial space to a maximum of \$0.31 per square foot of “chargeable covered and enclosed space.” (Govt. Code, § 5995(b)(2))

## SETTING

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### DEMOGRAPHIC CHARACTERISTICS

Relative to most other cities in California, San Francisco is much older and is far more densely populated, with approximately 800,000 people in only 47 square miles. With the exception of parks, the city is built out, and population growth occurs through intensification of land use, both market driven and Redevelopment Agency assisted redevelopment.

San Francisco has an economically and racially diverse population and is home to many cultures. It exhibits the range of urban issues typical of large cities. San Francisco is a major business center in finance, and like many central cities, has lost much of its manufacturing activity to more suburban, low-density communities. Domestic and international tourism has become a major element in the city's economy.

San Francisco County is the historic center of the San Francisco Bay Area, the nine counties that make up the region. San Francisco has unique demographic characteristics relative to the state and region. In 1990, San Francisco's population represented about 12 percent of the regional population of six million. San Francisco's population increased to approximately 801,000 by 2000 (Department of Finance), a 10 percent growth rate substantially greater than the 6.6 percent growth rate from 1980 to 1990. Nevertheless, San Francisco represents a declining share of the regional population, as other counties grow at a more substantial rate. **Socioeconomics Table 1** illustrates Association of Bay Area Government's (ABAG) Bay Area regional growth estimates from 1990 to 2000, and projections from 2000 to 2020. San Francisco's population is only expected to increase by one percent from 2000 to 2020 while the regional population expands almost 16 percent.

Compared to regional characteristics, the 1990 San Francisco population was older on average, with only 14 percent of the residents aged under 16 compared to 20 percent in the region, and 15 percent over the age of 65, somewhat above regional and state proportions of elderly population.

**SOCIOECONOMICS TABLE 1: Bay Area Population Trends**

Counties	1990	1995	2000	2005	2010	2015	2020
Alameda	1,276,702	1,345,900	1,462,700	1,573,200	1,615,900	1,641,700	1,671,700
Contra Costa	803,732	865,300	941,900	1,021,500	1,076,800	1,124,900	1,169,000
Marin	230,096	238,500	250,400	259,900	267,900	272,400	275,400
Napa	110,765	117,500	127,600	137,000	141,900	148,500	156,900
San Francisco	723,959	751,700	799,000	815,600	818,800	812,900	808,800
San Mateo	649,623	687,500	737,100	767,100	779,700	795,700	809,800
Santa Clara	1,497,577	1,599,100	1,755,300	1,854,000	1,919,000	1,970,600	2,016,700
Solano	339,471	370,700	401,300	450,300	481,700	514,800	547,400
Sonoma	388,222	418,100	455,300	501,500	529,700	551,100	571,200
Region	6,020,147	6,394,300	6,930,600	7,380,100	7,631,400	7,832,600	8,026,900

Source: ABAG Projections 2000

Please refer to the **Environmental Justice Screening Analysis** later in this assessment for a discussion on low-income and minority demographics within a six-mile radius of the project, the City and County of San Francisco, and the Bay Area.

## EMPLOYMENT CHARACTERISTICS

Year 2000 employment levels for the Bay Area were estimated by ABAG at 3.7 million, an increase of 15 percent from 1990 (ABAG, Projections 2000). However, there was a loss of jobs during the recession early in the decade, and unprecedented growth during the past five years. San Francisco also witnessed strong employment growth during the past five years, anchored by tourism and the internet/multi-media industry. With an estimate of a San Francisco resident labor force of 438,000 in 2000, and a peak of 458,500 in July 2001 (California EDD), an unemployment level of 2.7 percent, and an employment level of 629,000 in the City, it is clear that many residents of other counties commute to San Francisco. The failure of dot.com companies and tourism job losses resulted in an increase in unemployment to 4.5 percent in October 2001 from a low of 2.1 percent in October 2000.

According to analysis in San Francisco's *1999 Commerce and Industry Inventory Economic Summary (CIIES)*, knowledge-based activities have led recent job growth. During the 1988-98 decade, education services jobs grew 39 percent; office services (including professional services) grew by 15 percent, and finance by 10 percent. Employment in the retail sector also increased by six percent during this time frame. The knowledge-based economy attracts firms that seek highly skilled employees. High wages for these employees allows them to pay more for housing, both in San Francisco and the wider region. This has had adverse ramifications on regional housing prices (CIIES, pages 4/5). While there are approximately 20,000 construction jobs in San Francisco, about three percent of the labor force, there were 186,000 construction jobs in the nine Bay Area counties in 2000, representing five percent of regional jobs.

Several large public works construction efforts, including the San Francisco International Airport expansion and BART extension, are winding down as major construction efforts.

The closure of the Hunters Point Naval Shipyard in the 1970s cost the area over 10,000 jobs and particularly affected the retail economy of the Third Street corridor. Additional housing and industrial development in the India Basin area have helped, but the local South Bayshore economy is still in need of additional jobs and economic base.

## **HOUSING**

As of 2000, there were approximately 2.5 million housing units in the nine county Bay Area. In 1990, San Francisco had 328,470 housing units, with an average of 2.3 persons per household and a seven percent vacancy rate, according to the US Census. In contrast with the Bay Area, 66 percent of the San Francisco housing stock is rental, and only 34 percent of units are owner occupied. Census tract 226, which includes the proposed site, only contained 214 households in 1990, primarily in the “Dogpatch” neighborhood along Tennessee Street just west of 3<sup>rd</sup> Street. Since that time and increasing during the past few years, there has been considerable development of live-work loft type units in the area, particularly along Tennessee Street between 18<sup>th</sup> and Mariposa, but also on Minnesota at 23<sup>rd</sup> and 34<sup>th</sup> Streets. In addition, there is one new live-work development at the intersection of Mariposa and Illinois Streets, east of Third Street.

Since 1990, there have been 25 housing units built in the Central Waterfront area, and 325 live-work units. In terms of citywide comparisons, there have been 9,500 new housing units built since 1990, and an additional 1,800 live-work units (Rubin 2001). Thus, almost 20 percent of new live-work units have been built in the Central Waterfront area. Development of residential and live-work units continues in the neighborhood, with 18 active applications. Six of the 18 applications are in the vicinity of the intersections of Third, 21<sup>st</sup>, and Tennessee Streets.

Since the housing characteristics from the 2000 Census are not yet available, it is not possible to describe the population and household characteristics of the neighborhood as reflected in the current census. However, given the 40 percent population increase in the census tract from 1990 to 2000 and the fact that new lofts in the area have sold for as much as \$500,000, there is a level of reinvestment and development that is transforming the Central Waterfront area.

## **NEIGHBORHOODS AND BUSINESS**

A variety of small to medium size industrial businesses exist in the vicinity of the project site and transmission line corridor. The Port of San Francisco Terminals 94 and 96 are located northeast of Cargo Way, and a major US Post Office facility is on the south side of Cargo Way. The closest residential district is the “Dogpatch” neighborhood east of Potrero Hill, centered along Tennessee, Minnesota, and 22<sup>nd</sup> Streets between Third Street and I-280.

## **SCHOOLS**

The boundaries of the San Francisco Unified School District are co-terminus with those of the City and County of San Francisco. The District has approximately 115 schools, including 77 elementary schools, and had an enrollment of approximately 60,000 students in fall 1999. The two closest elementary schools to the project site are Starr King (1215 Carolina Street) and Daniel Webster (465 Missouri Street), both approximately three-quarters of a mile west of the project site. The student population at these two schools is almost 100 percent minority. Potrero Hill Middle School (655 De Haro Street) is approximately one mile west of the site. The International Studies Academy (693 Vermont) is the closest public high school, slightly over a mile west of the project site.

District enrollment is relatively steady, with annual fluctuations of approximately one percent. As a stable community, San Francisco is not faced with a need to build new schools to meet enrollment gains.

## **UTILITIES, EMERGENCY AND OTHER SERVICES**

San Francisco receives gas and electric service from Pacific Gas and Electric. The San Francisco Water Department supplies water to the site from the City's Hetch-Hetchy system and the Department of Public Works provides sewer service.

The San Francisco Fire Department provides fire protection and emergency medical response to the Potrero power plant site. Station 25, located approximately three-quarters of a mile south of the site, at 3305 Third Street, is the closest fire station. It was recently rehabilitated and re-opened in August 2000 (SECAL 2000b). A second station, at 798 Wisconsin, is less than one mile to the west. Several other stations are located two to three miles from the site.

San Francisco General Hospital, a full-service 550-bed facility, is located on Potrero Avenue, about 1.5 miles from the site. A community health clinic is located on Wisconsin Street in the Potrero Hill neighborhood, and several private medical clinics exist within a mile of the site. The San Francisco Police Department provides law enforcement. The closest station (Bayview Station) is at 201 Williams Street.

## **PUBLIC FINANCE**

The City and County of San Francisco (CCSF) has an annual budget of approximately \$4.2 billion, but this includes enterprise funds (water, airport, etc.), public transit, and public health. Total discretionary spending is about \$1.2 billion, of which 40 percent is for public protection services (Mayor's Budget, 1999-2000). Only 13 percent of total CCSF funds are derived from property taxes, or approximately \$550 million. Other significant local taxes include payroll taxes, sales taxes, and hotel taxes. In fiscal year 1997, the existing Potrero power plant generated \$671,000 in property taxes (AFC, page 8.8-13), slightly more than one percent of the CCSF total property tax revenues. The primary recipients of property tax revenues in San Francisco include the General Fund (51 percent), the San Francisco Unified School District General Fund and Educational Augmentation Fund (29 percent), and the City Bond Debt Fund (11 percent). A variety of smaller funds receive the remaining nine percent.

## IMPACTS

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### PROJECT-SPECIFIC IMPACTS

Staff reviewed the Potrero Power Plant Unit 7 Project Application for Certification (00-AFC-4) Volume 1, May 2000, Socioeconomic Section 8.8 and Appendix Q – Socioeconomics. The analysis evaluates conditions and potential impacts on population, housing, employment, public services and utilities. In addition, the analysis considers environmental justice. The applicant used appropriate public databases, such as California Employment Development Department, US Census Bureau, and information from local agencies for their analysis. Staff's analysis is based on verification of the information in the AFC and independent research as described below. Staff finds the AFC's socioeconomic analysis and conclusions to be acceptable.

### EMPLOYMENT

Peak employment at the project site during the 24-month construction period would be 287 workers, including 247 craft workers and 40 contractor staff. **Socioeconomics Table 2** shows the various trades that would be involved and the number of each required for each month of the construction period. The amendment to eliminate the brick façade around the power generation equipment will not affect the number of craft workers at any time during the construction period.

In the Bay Area economy, with over three million jobs, the peak construction employment of 287 workers would represent less than 0.2 percent of the construction labor force. The latest California Employment Development Department (EDD) labor force statistics show a construction employment of 47,300 for San Francisco, Marin, and San Mateo Counties for October 2001, including 26,000 in special trades. The cities of San Jose and Oakland are also within commute distance, and they would add 118,000 construction workers to the regional total. EDD staff confirms that there should be an available labor force within commute distance of the project. The City of San Francisco runs a "first source" employment program, and to the degree possible, staff suggests that Mirant work with the City to seek local workers in order to maximize the local employment benefits of plant construction and operation.

### HOUSING

Construction of the Potrero Power Plant is not expected to have a significant impact on housing demand in the San Francisco Bay Area. As described in the previous section, there is a large construction labor force within commute distance, and this project is one of a continuum of large construction projects that provide employment for the specialist trades cited as required in **Socioeconomics Table 2**. Even if there were a temporary shortage of workers in a specific trade, the Bay Area has a large rental housing supply (more than 700,000 units) as well as motels that would be available for workers on temporary assignment.

The number of workers (11) required to operate the plant is small, and should not have any impact on San Francisco housing demand.

## **NEIGHBORHOODS AND BUSINESS**

Construction of the on-site portions of the project will not have adverse impacts on the neighborhood or businesses in the area. Workers may purchase food and related items in neighborhood businesses, improving retail activity during the construction period. Construction of the underground cable portion along Illinois Avenue, Cargo Avenue, and Jennings Street, as well as under Islais Creek, has the potential to cause temporary adverse disruption of access to businesses along this corridor. With proper community outreach and notification, as well as careful construction staging and implementation of traffic detours, this can be reduced to a less than significant impact.

Construction staging for the Islais Creek undercrossing could encroach on several businesses located where Illinois Street ends at the Creek. Several weeks will be required to stage and construct the undercrossing, but with coordination, this should not disrupt access to any adjacent businesses in a manner that would have adverse impacts.

## **SCHOOLS**

Because of the large resident labor force available for construction and small permanent labor force that will operate the proposed project, there will not be any enrollment impacts on the San Francisco Unified School District. One-time school impact fees of \$35,700 would be generated by the school district fee of \$.15 per square foot of heavy industrial development (AFC, page 8.8-18).

## **PUBLIC FINANCE AND FISCAL**

Construction of the proposed project will generate one-time sales tax receipts, but since the majority of supplies and equipment will be purchased outside the Bay Area (and much of it outside of California), little sales tax in California will be generated by the project (SECAL 2000a). On-going property tax generation will be significant and positive depending on the assessed value of the improvements. If the investment in the project is \$300 million, approximately \$3 million annually in property taxes will be generated for the San Francisco General Fund, the San Francisco Unified School Districts, and other agencies.

SOCIOECONOMICS TABLE 2  
PROJECTED MONTHLY CONSTRUCTION LABOR BY CRAFT

Craft Type	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Demolition Supervisor	1	1	1																					
Laborers	7	10	14	15	20	20	25	25	20	20	20	20	20	16	16	16	16	15	12	10	8	5	5	5
Carpenters/ Millwrights	1	4	12	20	25	20	25	25	20	20	20	15	15	15	10	10	10	7	7	2	2	2	2	2
Ironworkers					3	5	10	20	20	20	20	20	15	10	10	5	3	2						
Heavy equip. Operator	8	14	16	12	12	11	10	10	7	6	6	6	6	6	5	5	4	4	3	2	1	1	1	
Teamsters	2	6	8	8	5	5	4	4	4	3	3	2	2	2	2	2	2	2	2	1	1	1		
Electricians			1	3	5	7	10	10	20	25	25	30	30	50	50	50	45	40	30	30	20	15	10	5
Pipefitters			2	5	8	12	20	20	30	50	75	100	100	100	100	100	100	75	65	35	15	3	5	3
Boilermakers								3	11	20	35	32	40	40	40	40	40	25	25	5				
Insulators														5	5	7	18	18	18	18	15	10	5	3
Painters															1	2	3	3	3	3	2	2	2	2
Cement finishers/masons		1	2	3	3	4	4	4	4	3	3	2	2	1	1	1	1	1	1	1				
Mechanics		1	1	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1	1		
Surveyors	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1							
Total craft labor	17	35	55	70	86	88	112	125	140	170	200	230	232	247	242	240	244	193	167	108	65	40	30	20
Contractor staff	9	14	19	20	20	25	25	30	30	35	40	40	40	40	40	40	40	35	30	25	20	15	10	5
Total labor	26	49	74	90	105	113	137	155	170	205	240	270	272	287	282	280	284	228	197	133	85	55	40	25

Source: AFC Table 8.8-8

## **ENVIRONMENTAL JUSTICE SCREENING ANALYSIS**

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The purpose of the screening analysis is to determine whether there exists a minority and/or low-income population within the potential affected area of the proposed project.

Minority and/or low-income populations, as defined by the U.S. Environmental Protection Agency's April 1998 Guidance for Incorporating Environmental Justice Concerns in EPA's NEPA Compliance Analyses, are identified where either:

- the minority population of the affected area is greater than fifty percent of the affected area's general population; or
- the minority population percentage of the area is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographic analysis.

Energy Commission staff has determined the potential affected area as a six-mile radius of the Potrero site. The six-mile radius is consistent with the radius used for staff's cumulative air quality analysis. When a minority and/or low-income population is identified, per the above, staff in the technical areas of air quality, public health, hazardous materials, noise, soils and water resources, waste management, traffic and transportation, visual resources, land use, socioeconomic and transmission line safety and nuisance consider possible impacts on the minority/low-income population as part of their analysis. This "environmental justice" (EJ) analysis consists of identification of significant impacts (if any), identification of mitigation, and determination of whether there is a disproportionate impact if an unmitigated significant impact has been identified. Staff's environmental justice approach includes providing notice (in appropriate languages) of the proposed project and opportunities for participation in public workshops to minority and/or low-income communities, and providing information on staff's EJ approach to minority and/or low-income persons who attend staff's public workshops.

In addition to the six-mile radius, staff looked at those populations within 1-, 2-, and 4-mile radii of the site, the City and County of San Francisco, the nine-county San Francisco Bay Area, and the State of California.

## **MINORITY AND LOW-INCOME POPULATION ANALYSIS**

For the Preliminary Staff Analysis (PSA) staff relied on 2000 population estimates provided by Claritas because 2000 census data was not yet available. 2000 census data for race and Hispanic origin is now available and staff has used this data in the Final Staff Analysis (FSA).

Because of community concerns, staff has used both block- and tract-level data in the environmental justice analysis. Staff used census data at the block level to map minority populations in the six-mile radius because census blocks are the smallest geographic entity for which the Census Bureau collects and tabulates decennial census information. Census blocks are not equal in size nor are they "city blocks." The spatial size of census blocks varies depending on the density of settlements and in sparsely



settled areas they may contain many square miles of territory. Census tracts are relatively permanent statistical subdivisions of a county and are delineated with the intention of being maintained over many decades so that statistical comparisons can be made from decennial census to decennial census. Therefore, data at the tract level is more readily available and more widely used by government agencies and those working with census data.

**Socioeconomics Table 3** shows 2000 census data at the block level for minority populations within one-, two-, four, and six-mile radii of the project, and 2000 census data for the City and County of San Francisco, the Bay Area, and the State of California. **Socioeconomics Table 4** shows 1990 census data for low-income populations within one-, two-, four, and six-mile radii of the project, the City and County of San Francisco, the Bay Area, and the State of California. Census 2000 data on poverty is not yet available. **Socioeconomics Figure 1** shows population at the census block level within the six-mile radius. Data in **Socioeconomics Table 3** show over 57 percent minority residents within a six-mile radius of the project site. Data from this table also shows similar percentages of minority populations in the City and County of San Francisco, and the State of California.

**Socioeconomics Figure 2** shows population at the census tract level within the six-mile radius. Census tract 226 where the project is located comprises most of the area known as the Central Waterfront. The Central Waterfront is a 500-acre area bordered by I-280, Mariposa Street, Islais Creek, and the San Francisco Bay. The Central Waterfront is home to light and heavy industrial activities, interspersed with residential areas, primarily in the area known as the Dogpatch. Census tract 226 has a total population of 846 persons and a minority population of 28.13 percent, which is significantly lower than the citywide average of 56.36 percent. The population of the Central Waterfront increased for all races except for African Americans, which declined by 40.0 percent (SPUR). The decline in the African American population is attributable to older homeowners selling to younger, affluent homebuyers (SPUR).

While the project tract does not represent a sizeable minority percentage, the screening analysis for the six-mile radius based on census blocks shows an environmental justice population of 57.57 percent.

**SOCIOECONOMICS TABLE 3: Minority Populations**

	Total Population <sup>1</sup>	Minority Population <sup>2</sup>	Percent Minority
1 Mile Radius	26,813	18,153	43.29%
2 Mile radius	162,501	111,895	71.16%
4 Mile Radius	570,581	321,860	56.43%
6 Mile Radius	870,289	454,031	57.57%
City and County of San Francisco	776,733	437,824	56.36%
Bay Area <sup>3</sup>	6,783,760	3,391,556	50.0%
State of California	33,871,648	18,054,858	53.30%
1. 1. Source:Census 2000. 2. 2. Minority includes non-white and white-Hispanic populations. 3. 3. Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano, and Sonoma Counties.			

The poverty threshold for a family of four persons was \$12,674 per year (1990 US Census Data). To determine the number of persons below the poverty level, Energy Commission staff reviewed data from the 1990 US Census: Poverty Status By Age; Universe: Persons for whom poverty status is determined. Because the USEPA Guidance does not give a threshold to determine the existence of a low-income population, Energy Commission staff uses the fifty-percent and meaningfully greater thresholds used for minority populations. The data in **Socioeconomics Table 4** indicates that there is not a greater than fifty percent or meaningfully greater population of low-income people within the project area.

SOCIOECONOMICS TABLE 4: Low-Income Populations

	Population Below Poverty Level <sup>1</sup>	Percent Below Poverty Level
1 Mile Radius	1,849	22.3%
2 Mile radius	17,449	18.9%
4 Mile Radius	70,090	14.4%
6 Mile Radius	92,177	12.3%
City and County of San Francisco	90,019	12.7%
Bay Area <sup>2</sup>	502,354	8.5%
State of California	3,627,585	12.5%
1. Source: 1990 US Census. 2. Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano, and Sonoma Counties.		

## Socioeconomics Figure 1

## Socioeconomic Figure 2

## COMMUNITY CONCERNS

In response to long-term community concerns with the Potrero Plant, the San Francisco Board of Supervisors initiated a Citizens Advisory Committee on Potrero, chaired by Supervisor Yee's office. Also, there are several community groups who are participating as Intervenors, including Southeast Alliance for Environmental Justice (SAEJ), Potrero Boosters Association, Potrero Neighborhood House, Bayview Hunters Point Community Activists, Our Children's Earth Foundation (OCE), and Citizens for a Better Environment (CBE). Some of these groups, including representatives from the City and County of San Francisco have held monthly meetings on the proposed project since June 2000.

In March 2000, Energy Commission Public Health and legal staff met with representatives from the City and County of San Francisco Department of Public Health, City and County of San Francisco Bayview Hunters Point Health and Environmental Assessment Task Force, City and County of San Francisco Planning Department, Bayview Hunters Point Community Activists, and UCSF. Bayview Hunters Point, comprising census tracts immediately south of Potrero Hill, has a large African-American and Asian-American population. Bayview Hunters Point is home to several recycling centers, auto wrecking yards, an animal rendering plant, a waste water treatment plant, two PG&E owned power plants, and hazardous waste sites at both the Port of San Francisco and the Hunters Point Naval Shipyard.

The discussion focused on health and environmental issues associated with the Potrero plant and other industrial uses in the Bayview and Potrero neighborhoods. Please refer to the section on **Public Health** for further information regarding public health issues associated with the project.

On April 12, 2001, Energy Commission staff held an environmental justice outreach meeting in Potrero Hill. Meeting notices were mailed to everyone on the Proof of Service (POS) List, including Claude Wilson, Executive Director of SAEJ, Alan Ramo, Counsel for SAEJ, Tiffany Schauer, Executive Director for OCE, Anne Simon at CBE, and John DeCastro, President of Potrero Boosters Neighborhood Association, Californians for Renewable Energy (CARE), and the general mailing list, which includes property owners and concerned citizens who had attended prior meetings and had asked to be put on the mailing list. In addition, the Commission Public Adviser's Office staff sent flyers of the meeting to local public schools. At the April 12 meeting, staff gave a presentation of the three primary components of staff's environmental justice analysis: demographics, public outreach, and impacts assessment.

Staff held a second environmental justice meeting in the Potrero Hill neighborhood on August 2, 2001 to discuss staff's Preliminary Staff Assessment, in particular the areas of air quality, public health, land use, water, hazardous materials, and demographics.

## RESPONSES TO PUBLIC AND AGENCY COMMENTS ON THE PSA

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### MARK STOUT (MS)

**MS-1:** *Socioeconomics/EJ – “The environmental justice implications...are huge, with 81% minority population within 2 mile radius of the plant, compared with a 48% Bay Area average...”*

**Response:** Data in **SOCIOECONOMICS Table 3** shows that the minority population within a two-mile radius is 71.16 percent and the minority population within the Bay Area is 50.0 percent. As presented in staff's **ENVIRONMENTAL JUSTICE SCREENING ANALYSIS**, an environmental justice population is present within the six-mile radius of the proposed project.

### CITY AND COUNTY OF SAN FRANCISCO (CCSF)

**CCSF-10:** *Socioeconomic Resources and Environmental Justice issues are not adequately addressed in the PSA.*

**Response:** Staff will respond to those comments that are socioeconomic related. For comments related to other technical areas in CCSF-10, please refer to the specific technical areas for responses. For the entire text of the City and County of San Francisco's comments on Socioeconomics and Environmental Justice, please refer to their comments to the May 31, 2001 Preliminary Staff Assessment docketed July 3, 2001. Staff notes that because the CCSF's comments were made in July, 2001 when the PSA was published, many of their concerns have been addressed in the FSA.

As stated above in the **ENVIRONMENTAL JUSTICE SCREENING ANALYSIS**, staff defines the potential affected area as a six-mile radius of the proposed project site. The six-mile radius is consistent with the radius used for staff's cumulative air quality analysis. When a minority and/or low-income population is identified, per the above, staff in the technical areas of air quality, public health, hazardous materials, noise, soils and water resources, waste management, traffic and transportation, visual resources, land use, socioeconomic and transmission line safety and nuisance consider possible impacts on the minority/low-income population as part of their analysis. As such, staff does not look just at the race, ethnicity, and income levels of school children to determine the presence of an EJ population but instead looks at those factors for the entire population in the six-mile radius.

As stated in **SOCIO-1**, staff is requiring the project owner and its contractors and subcontractors to recruit employees and procure materials and supplies within the City and County of San Francisco first and the Bay Area second.

### POTRERO POWER PLANT CITIZENS ADVISORY TASK FORCE (PTF)

**PTF-10:** *The Assessment does not address plant revenues or profitability regarding profits to applicant versus little to no community benefits.*

**Response:** As stated above, a socioeconomic impact analysis evaluates the effects of short- and long-term project-related population changes on housing, employment, local schools, medical and protective services, as well as the fiscal and physical capability of local governmental agencies to meet the needs of project-related changes in population. As shown in the analysis, no in-migration of population will occur for project

construction or operation. As noted above, approximately \$3 million annually in property taxes will be generated by the project for the San Francisco General Fund, the San Francisco Unified School Districts, and other agencies. Also, effects of a project analyzed under the California Environmental Quality Act (CEQA) must be related to a physical change in the environment; economic and social effects are not considered environmental effects under CEQA unless they would lead to an environmental effect.

## **PIER 70 ADVISORY GROUP (P70)**

**P70-1:** *Potrero Power Plant Expansion Project Impact Identification and Mitigation Proposals – Environmental Justice.*

**Response:** See response to PTF-10 above.

## **CUMULATIVE IMPACTS**

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There are a number of projects on-going or anticipated that could partially overlap with the construction of the proposed project. Development of the Mission Bay campus of the University of California San Francisco is underway at the intersection of Third and 16<sup>th</sup> Streets in the Mission Bay area. San Francisco MUNI has initiated development of a train storage and maintenance facility at 25<sup>th</sup> Street and Illinois Street, and anticipates construction of the Third Street light rail project. Smaller projects, including the development of live-work units, are expected to continue in the Central Waterfront area. The cumulative employment and business impacts of new construction are considered positive.

Other larger projects that require a substantial construction labor force include the retrofitting of the West Span of the Bay Bridge and Central Freeway in San Francisco, as well as the anticipated construction of the replacement East Span of the Bay Bridge. There may be construction of other power plants within the Bay Area. The only potential impact from a cumulative socioeconomic point of view would be the possible shortage of workers in some trades. However, given the large work force in the construction trades in the Bay Area, and the on-going series of major projects (Caltrans, San Francisco International Airport, BART, etc.), staff believes that there is an adequate number of available workers. Even if a small number of workers temporarily relocated to work on the proposed project, their presence in the area's housing market would be a less than significant impact due to the constant turnover of workers and households.

## **MITIGATION**

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Staff believes that the economic and fiscal impacts of the project will be a benefit to the region and City of San Francisco in terms of increased economic activity and tax revenues to local agencies.

Staff is proposing a condition where the project owner will notify project area businesses of scheduled construction and traffic control techniques to ensure that the construction process, particularly for the underground transmission line connection to the Hunters Point substation, will not significantly disrupt business activity. Contractors and subcontractors involved with the process will take all feasible measures to mitigate the construction impacts on access to active businesses in the project area, consistent with

the CCSF Department of Planning and Traffic Regulations for Working in San Francisco Streets.

## CONCLUSIONS AND RECOMMENDATIONS

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Staff has determined that there will be no construction and operation-related impacts to housing, schools, and public services. To ensure that some economic benefit occurs in the project area, staff has proposed a condition of certification that requires the project owner and its contractors and subcontractors to recruit employees and procure materials and supplies locally. Staff also proposes a condition of certification requiring the project owner to pay a one-time school impact fee based on the San Francisco Unified School District's fee schedule of \$.15 per square foot for industrial development.

If the Energy Commission certifies the proposed project, staff recommends that it adopt the following conditions of certification.

## PROPOSED CONDITIONS OF CERTIFICATION

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**SOCIO-1** The project owner and its contractors and subcontractors shall recruit employees and procure materials and supplies within the City and County of San Francisco first, and the Bay Area second unless:

- To do so will violate federal and/or state statutes;
- The materials and/or supplies are not available;
- Qualified employees for specific jobs or positions are not available; or
- There is a reasonable basis to hire someone for a specific position from outside the local area.

**Verification:** At least 60 days prior to the start of demolition, the project owner shall submit to the CPM copies of contractor, subcontractor, and vendor solicitations and guidelines stating hiring and procurement requirements and procedures. In addition, the project owner shall notify the CPM in each Monthly Compliance Report of the reasons for any planned procurement of materials or hiring outside the local regional area that will occur during the next two months.

**SOCIO-2** The project owner shall pay the one-time statutory school facility development fee as required at the time of filing for the in-lieu building permit with the San Francisco Building Department.

The project owner shall provide proof of payment of the statutory development fee in the next Monthly Compliance Report following the payment.

**SOCIO-3** Prior to start of construction of the underground transmission line, the project owner shall provide a written notice of the proposed schedule and traffic control techniques that will be employed during construction to businesses and institutions that could be affected along the right-of-way.

**Verification:** At least 30 days prior to start of construction of the underground transmission line, the project owner shall distribute the notice to all potentially affected businesses and institutions along the affected right-of-way. The project owner shall provide proof of mailing or other appropriate documentation in the next Monthly Compliance Report following the distribution.



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# TRAFFIC AND TRANSPORTATION

Testimony of James Fore

## INTRODUCTION

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The Traffic and Transportation section of the Final Staff Assessment (FSA) addresses the extent to which the Potrero Power Plant Unit 7 Project (Unit 7) expansion may impact the transportation system within the vicinity of its present operation. Staff's analysis includes the evaluation and identification of:

- The influx of construction workers for the expansion project and how they could increase roadway congestion and affect traffic flow during the construction phase;
- The roads and routings which the project proposes to use;
- Potential traffic related problems associated with those routes;
- The anticipated deliveries of oversize/overweight equipment;
- The anticipated encroachment upon public right-of-ways during the construction of the proposed expansion project and associated appurtenant facilities;
- The frequency of trips and probable routes associated with the delivery of hazardous materials;
- The availability of alternative transportation methods such as rail; and
- The impact of Unit 7 construction activity on the barge and vessel traffic in San Francisco Bay.

Staff has analyzed the traffic and transportation information provided by the applicant in the Application for Certification (AFC) and other sources to determine if the project will have significant traffic and transportation impacts. Where traffic and transportation impacts were identified, staff has assessed the availability of mitigation measures that could be applied to reduce or eliminate the significance of those impacts. Conditions of certification are included to implement the appropriate mitigation measures and to ensure that the project complies with the applicable Laws, Ordinances, Regulations and Standards (LORS).

## LAWS, ORDINANCES, REGULATIONS AND STANDARDS

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### FEDERAL

*The federal government addresses transportation of goods and materials in Title 49, Code of Federal Regulations:*

- Title 49, Code of Federal Regulations, Sections 171-177, govern the transportation of hazardous materials, the type of materials defined as hazardous, and the marking of the transportation vehicles.

- Title 49, Code of Federal Regulations, Sections 350-399, and Appendices A-G, Federal Motor Carrier Regulations, addresses safety considerations for the transport of goods, materials and substances over public highways.
- Title 14, Code of Federal Regulations, Section 77.13(2)(I), requires an applicant to notify the Federal Aviation Administration (FAA) of construction of structures with a height greater than an imaginary surface extending outward and upward at a slope of 100 to 1 from the nearest point of the nearest runway of an airport (i.e. San Francisco and/or Oakland) with at least one runway more than 3,200 feet in length.
- Title 14, Code of Federal Regulations, Section 77.17, requires an applicant to provide Notice of Proposed Construction or Alteration (FAA Form No. 7460-1) to the FAA.
- Title 14, Code of Federal Regulations, Section 77.21, 77.23, and 77.25 outline the criteria used by the FAA to determine whether an obstruction would create an air navigation conflict.
- Title 33, Code of Federal Regulations, Navigation and Navigable Waters, Section 110.224 requires that written permission must be obtained from the Captain of the Port (Commanding Office, Marine Safety Office San Francisco Bay) prior to anchoring outside of a designated anchorage.

## STATE

The California Vehicle Code and the Streets and Highways Code contain requirements applicable to the licensing of drivers and vehicles, the transportation of hazardous materials and rights-of-way. In addition, the California Health and Safety Code addresses the transportation of hazardous materials. Specifically, these codes include:

- California Vehicle Code, section 353 defines hazardous materials.
- California Vehicle Code, Sections 31303-31309, regulate the highway transportation of hazardous materials, the routes used, and restrictions thereon.
- California Vehicle Code, Section 31030, requires that permit applications shall identify the commercial shipping routes they propose to utilize for particular waste streams.
- California Vehicle Code, Sections 31600-31620, regulate the transportation of explosive materials.
- California Vehicle Code, Sections 32000-32053, regulate the licensing of carriers of hazardous materials and include noticing requirements.
- California Vehicle Code, Sections 32100-32109, establish special requirements for the transportation of inhalation hazards and poisonous gases.
- California Vehicle Code, Sections 34000-34121, establish special requirements for the transportation of flammable and combustible liquids over public roads and highways.
- California Vehicle Code, Sections 34500, 34501, 34501.2, 34501.4, 34501.10, 34505.5-7, 34507.5 and 34510-11, regulate the safe operation of vehicles, including those which are used for the transportation of hazardous materials.

- California Vehicle Code, Sections 2500-2505, authorize the issuance of licenses by the Commissioner of the California Highway Patrol for the transportation of hazardous materials including, but not limited to explosives.
- California Vehicle Code, Sections 13369, 15275, and 15278, address the licensing of drivers and the classifications of licenses required for the operation of particular types of vehicles. In addition, it requires the possession of certificates permitting the operation of vehicles transporting hazardous materials.
- California Streets and Highways Code, Sections 117 and 660-72, and California Vehicle Code 35780 et seq., require permits for the transportation of oversized loads on county roads.
- California Streets and Highways Code, Sections 660, 670, 1450, 1460 et seq., 1470, and 1480, regulate rights-of-way encroachment and the granting of permits for the encroachment on state and county roads.
- California Health and Safety Code, Sections 25160 et seq., address the safe transport of hazardous materials.

## **CITY AND COUNTY**

The City and County of San Francisco (CCSF) have jurisdiction over the local roadways in the vicinity of the Potrero Power Plant. The Transportation Element of the San Francisco General Plan provides detailed requirements for traffic impact analysis. If the project generates 50 trips during peak trip periods, a traffic impact evaluation must be completed. The traffic impact analysis needs to cover the following areas:

- Project description;
- Project setting;
- Travel demand analysis (including trip generation, roadway level of service (LOS), and distribution);
- Transportation impact analysis (including transit and parking); and
- Appropriate mitigation measures.

Since this project will generate at least 50 peak period trips, a traffic impact evaluation has been prepared.

An LOS analysis has been used to evaluate the impact that construction and operation traffic would have on the area roadways. The LOS is used to describe the flow of traffic along roadways and at intersections. Mitigation measures will be required for those roadways where the project degrades intersections operating at a LOS of A, B, C, or D to E or F. See **TRAFFIC AND TRANSPORTATION Table 1, Level of Service Criteria For Signalized Intersections.**

## **SETTING**

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*Mirant Corporation is proposing an expansion of its existing Potrero Power Plant through building Unit 7. Unit 7 will be located in an industrial area along the waterfront*

in the CCSF on approximately 6.5 acres of the existing 20-acre Potrero Power Plant (Potrero PP) site, see **TRAFFIC AND TRANSPORTATION Figure 1, Roadways in the Vicinity of the Potrero Power Plant**. The existing plant site is surrounded by industrial uses on the north, south and west. The eastern boundary is the San Francisco Bay shoreline.

## REGIONAL DESCRIPTION

Local transportation routes in the area of Unit 7 include freeways, highways, and local roadways. Plant construction and operation traffic will use the current area roadways. The regional and local roadways in the area that will be most affected by Unit 7 are shown in **TRAFFIC AND TRANSPORTATION Table 2, Characteristics of Roadways In The Area**.

**TRAFFIC AND TRANSPORTATION Table 1**  
**Level of Service Criteria For Signalized Intersections**

LOS	Description	Vehicle Delay (Seconds)
A	Free flow and insignificant delays.	< 5.0
B	Stable operation and minimal delays; many drivers begin to feel somewhat restricted.	>5.0 and ≤ 15.0
C	Stable operation and acceptable delays.	>15.0 and ≤ 25.0
D	Approaching unstable and tolerable delays; vehicle queues may develop but dissipate rapidly.	>25.0 and ≤ 40.0
E	Unstable operation and significant delays; long queues may form upstream from the intersection.	>40.0 and ≤ 60.0
F	Forced flow and excessive delays; vehicle queues may block upstream intersections.	> 60

SOURCE: NATIONAL RESEARCH BOARD, TRANSPORTATION RESEARCH BOARD, *Highway Capacity Manual Special Report 209, Third Edition Page 9-6*

**TRAFFIC AND TRANSPORTATION Table 2**  
**Characteristics of Roadways In The Area**

	Classification	Capacity	Average Daily Traffic Volume	Peak Daily Traffic Volume
<b>Regional Roadways</b>				
<i>Interstate 280</i>	<i>Freeway</i>	<i>288,000</i>	<i>156,000</i>	<i>164,000</i>
<i>US 101</i>	<i>Freeway</i>	<i>384,000</i>	<i>252,000</i>	<i>262,000</i>
<b>Local Roadways</b>				
<i>Third Street</i>	<i>Arterial</i>	<i>49,000</i>	<i>21,000</i>	<i>23,100</i>
<i>Evans Avenue</i>	<i>Arterial</i>	<i>32,000</i>	<i>14,600</i>	<i>16,060</i>
<i>Cesar Chavez Street</i>	<i>Arterial</i>	<i>32,000</i>	<i>12,000</i>	<i>13,200</i>
<i>Illinois Street</i>	<i>Collector</i>	<i>12,000</i>	<i>3,400</i>	<i>3,740</i>
<i>Cargo Way</i>	<i>Collector</i>	<i>24,000</i>	<i>8,759</i>	<i>9,635</i>

Source: SECAL 2000a, Table 8.10-1 Page 8.10-29

General access to the Unit 7 site will be from both Interstate-280 (I-280) and US Highway 101 (US 101). Direct access to the site will be via Illinois and 23<sup>rd</sup> Street.

## **Freeways and Highways**

### **Interstate 280**

*I-280 begins south of San Francisco's Market District and passes approximately five blocks west of Unit 7. I-280 runs south to San Jose and is*

### ***TRAFFIC AND TRANSPORTATION Figure 1 Roadways in the Vicinity of the Potrero Power Plant***

*composed of six to eight lanes of mixed-flow traffic with a daily capacity of 288,000 vehicles in the vicinity of Unit 7. California Department of Transportation (Caltrans) placed I-280 daily average traffic volume at 156,000 vehicles with a peak daily traffic volume of 164,000 vehicles in 1998. Access to Unit 7 from I-280 would be the 25<sup>th</sup> Street exit for southbound traffic and the Cesar Chavez/Army Street exit for northbound traffic.*

## **US Highway 101**

*US 101 is a north/south freeway located approximately one mile west of the project. US 101 is an eight lane limited access freeway with a capacity of 389,000 vehicles. The Caltrans 1998 traffic counts indicate an average daily traffic volume of 252,000 vehicles with a peak daily traffic volume of 262,000 vehicles. Access to Unit 7 from US 101 would be via the Cesar Chavez/Army Street interchange for both northbound and southbound traffic.*

## **Local Roadways**

Access to the project site for construction and operation traffic will be by existing city streets. This network of local roadways is shown in **TRAFFIC AND TRANSPORTATION Table 2, Characteristics Of Roadways In The Area.**

City streets in the area that provide access to Unit 7 are Third Street, Cesar Chavez/Army Street, and 25<sup>th</sup> Street. Direct access to Unit 7 is by a driveway off of Illinois Street between 22<sup>nd</sup> and 23<sup>rd</sup> Streets. This is a dedicated entrance to the project with a gate and guard station to preclude public access.

### **Third Street**

Third Street is a major north south roadway two blocks west of Unit 7. It is a commercial street that provides an access route for industry located along the waterfront area. Third Street is a six-lane arterial with three 10 foot-wide traffic lanes in both directions. The street has a center median, with openings for left turns at intersecting streets such as 22<sup>nd</sup> and 23<sup>rd</sup> Streets. Left turn lanes are provided at intersections with other major arterial roadways, but are not provided at minor intersections. On-street parking is normally allowed on both sides of the street. Third Street carries approximately 21,000 vehicles per day.

The San Francisco General Plan designates Third Street as a Major Arterial and Primary Transit Route. The plan also designates Third Street as a Neighborhood Commercial Street and a Citywide Bicycle Route.

### **Cesar Chavez Street**

Cesar Chavez Street is a major arterial located five blocks south of the project running in an east west direction. Cesar Chavez Street provides access to the project from both I-280 and US 101. This street intersects Third Street from which vehicles traveling to the project site can access the site by turning north on Third Street and proceeding to 23<sup>rd</sup> Street. Cesar Chavez Street is also a Citywide Bicycle Route.



## **25<sup>th</sup> Street**

25th Street provides access directly to I-280 northbound at either Indiana Street, or via Pennsylvania Avenue to reach the I-280's southbound lanes.

## **Other local Streets**

Other area roadways that will be impacted by the construction of Unit 7 and the underground transmission line connecting Potrero PP to the Hunters Point Substation are 23<sup>rd</sup> Street, Cargo Way, Jennings Street, Evans Avenue, Hunters Point Boulevard, Innes Avenue and Illinois Street.

Traffic control along 23<sup>rd</sup> Street, Cargo Way and Illinois Street consists of 25 miles per hour posted speed limits, and stop signs. These roadways provide one travel lane in each direction and have on street parking on both sides. Traffic signals exist at the intersections of Third Street and 22<sup>nd</sup> and 23<sup>rd</sup> Streets.

Illinois Street has two lanes of travel and parking on both sides of the street. Illinois Street carries approximately 3,400 vehicles per day. Cargo Way carries approximately 8,579 vehicles per day.

Evans Avenue, Hunters Point Boulevard, and Innes Avenue are four-lane arterials running in a generally east-west direction between Cesar Chavez Street and Hunters Point. The two-way average daily traffic on Evans Avenue east of Mendell Street is approximately 14,600 vehicles.

## **AIRPORT**

There are two major airports in the vicinity of Unit 7, San Francisco International Airport and Oakland International Airport. San Francisco International Airport is approximately 15 miles south of Unit 7, and Oakland International Airport is located approximately 10 miles east across San Francisco Bay.

## **RAILROADS**

The applicant has indicated that the heavy equipment items could be brought to Pier 80 or Pier 96 by rail. The equipment would then be off-loaded and transported to the site by either common carrier or heavy equipment haulers.

Equipment delivered at Pier 80 would take the following route to the plant site: trucks would take Cesar Chavez to Third Street, the trucks would then proceed north on Third Street turning right on either 25<sup>th</sup>, 24<sup>th</sup>, or 23<sup>rd</sup> Street and left onto Illinois Street to the site. If the equipment is delivered to Pier 96, trucks would use Cargo Way to Third Street, crossing the Third Street bridge going north. The trucks would then turn right on either 25<sup>th</sup>, 24<sup>th</sup>, and 23<sup>rd</sup> Street and left onto Illinois Street to the site, (SEP2000Dres1, Data Response No. 44).

If equipment cannot be transported by rail to Pier 80 or Pier 96, then delivery would be taken in Oakland and loaded onto barges to be transported across the Bay to either Pier 80 or 96. Once offloaded, the equipment would be moved to the project site by one of the routes outlined above.

## **PUBLIC TRANSPORTATION**

CCSF has several forms of public transportation, including local and regional buses, rail and ferry services. The San Francisco Municipal Railway (MUNI) has several routes in the vicinity of Unit 7. They are routes 9, 15, 22 and 48.

Route 9 extends from Visitacion Valley north to downtown San Francisco. Route 9 connects with Route 22 and Route 48 that travel along Illinois Street north of Unit 7.

Route 15 is the primary line that serves the Central Basin and Hunters Point areas. Route 15 runs along Third Street, which is one block west of Illinois Street.

Route 22 connects from Fillmore and Bay Streets in the Marina district south through Pacific Heights and Mission Dolores before heading southeast to Third Street. The route then returns north at 20<sup>th</sup> Street, with a stop two blocks north of Unit 7.

Route 48 provides cross-town service from the West Portal community to Potrero Hill. This route has a stop at 22<sup>nd</sup> and Illinois adjacent to the site; it then travels west on 22<sup>nd</sup> Street with connections to Routes 15 and 9.

MUNI routes that would be directly impacted by the construction would be those located along the route the proposed buried transmission line would follow between Unit 7 and Hunters Point. This would include routes 19 and 44 at the intersection of Jennings/Hunters Point Boulevard.

Caltrain provides commuter rail service between Santa Clara, San Mateo and San Francisco counties. The closest station to Unit 7 is the 22<sup>nd</sup> Street and Pennsylvania Avenue Station, which is six blocks west of the project.

## **BICYCLE ROUTES**

There are several bicycle routes located along roadways that will be impacted by the project. Both Third Street and Cesar Chavez Street function as city bicycle routes.

## **LINEAR FACILITIES**

Potentially affected roadways are those adjacent to or crossed by the proposed project linear components (i.e. transmission line, natural gas pipeline, water supply and wastewater pipelines).

### **Transmission Line**

Construction of Unit 7 will result in two points of interconnection to the Pacific Gas and Electric (PG&E) system. The connections will be at the Potrero and Hunters Point Substations. PG&E's Potrero Substation is located directly adjacent to the proposed Unit 7. The transmission interconnection to the existing Potrero substation will occur via

overhead transmission lines. Therefore, no roadways will be impacted by the construction of the Potrero Substation transmission connection.

The transmission line connecting Potrero PP to the PG&E Hunters Point Substation will be via underground cables that will be buried within road rights of way. The Hunters Point switchyard is approximately 1.8 miles from the proposed location for Unit 7. Traffic and property accessibility along the underground transmission route will be impacted by this construction.

### **Natural Gas Pipeline**

The natural gas fuel supply for the Potrero Power Plant is via a 24-inch gas line from PG&E San Francisco Center. At Mirant's request PG&E evaluated its ability to supply the Potrero facility after Unit 7 was installed. PG&E indicated that the current natural gas connection would be capable of supplying both Unit 3 and Unit 7 requirements (CCSF 2000Dreq1. Data response No. 23). Therefore, the Hunters Point power plant will not have to be taken out of service for natural gas to be supplied to Unit 7 as originally indicated in the AFC. Unit 7 will not require the construction of a natural gas fuel supply pipeline, therefore there will be no impact on traffic.

### **Water Supply Line**

There will be no offsite construction for linears associated with the water supply for the plant, therefore no roadways will be impacted.

### **Wastewater Discharge**

Depending upon the use of water, wastewater will be disposed in one of two ways, either to the San Francisco Bay or the city sewer system. Unit 7 will not require the construction of site wastewater discharge pipelines. Therefore, there will be no impact on traffic for wastewater pipelines.

### **Cooling Water Supply System**

The existing Unit 3 along with the new Unit 7 will use a steam cycle that requires the circulation of cooling water. The Potrero PP will utilize seawater drawn from San Francisco Bay through an intake structure on the Potrero PP waterfront. After the cooling water passes through the condenser it will be discharged to the Bay through offshore diffusers. The diffusers are four pipelines that extend approximately 900 feet into the Bay. The diffuser pipes will be laid directly in the bay bottom and at approximately 70-foot intervals a 6-inch thick concrete grout mattress will be laid over each pipeline. To provide a smooth transition to the diffuser portion of the discharge, some trenching may be required.

### **Access Routes**

Because Unit 7 is an addition to the presently operating Potrero facility, land access to the power plant will be by the existing access roads located on the southern and western sides of the site. Direct access for the site is provided by Illinois Street and 23<sup>rd</sup> Street. General access to the site vicinity is via I- 280 or US 101. There will be no traffic impact for access road construction.

Marine access for the barges related to construction of the water intake and outflow diffusers will be via normal shipping channels in the San Francisco Bay. If any of the barges or vessels associated with the construction of the cooling water intake and outtake system must anchor or moor in any manner other than to an existing approved dock or pier then they could create a hazard to shipping in the Bay.

## **IMPACTS**

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The California Environmental Quality Act (CEQA) indicates that a project could have a significant effect on traffic and transportation if the project will:

- Cause an increase in traffic, which is substantial in relation to the existing traffic load and capacity of the highway and road system (i.e. result in a substantial increase in either the number of vehicle trips, the volume to capacity ratio on roads, or congestion at intersections).
- Exceed, either individually or cumulatively, a level of service standard established by the county congestion management agency for designated roads or highways.
- Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses.
- Result in inadequate parking capacity.

## **POWER PLANT**

### **Construction Phase**

The primary traffic impact of Unit 7 expansion will be during the construction phase. During construction, the number of trips generated by the site will increase significantly due to construction workers and construction-related deliveries of equipment and material. To evaluate the impact of construction traffic, the impacts on the area roadways and intersections were analyzed using the current traffic counts and the estimated traffic generated during the peak construction phase.

### **Commuter Traffic**

During the peak construction months (months 12 through 17), an average of 279 workers are expected to access the site daily. It was assumed that 1.5 percent of the workers would use the CCSF transit system, thereby resulting in 275 construction worker trips. If each of these workers drives to the site, this will result in 275 daily inbound and 275 outbound commute trips. It was assumed that the majority of workers coming to the plant would use surface streets. The greatest impact of the commuter traffic would be on Third Street. The vehicle trips were assumed to be distributed in the following manner, 20 percent of the trips are assumed to arrive from southbound US 101 while the remainder would use surface streets and be split evenly between the north and south (SECAL 2000a, AFC page 8.10-14).

### **Truck Traffic**

There are streets within the vicinity of Unit 7 that have vehicle weight restrictions. Palou, Quesada, Revere, Shafter, and Thomas Avenues prohibit vehicles with weight

greater than 6,000 pounds. Truck weights greater than 11,000 pounds are prohibited south of the Unit 7 construction area on Third Street between Evans Avenue and Carroll Avenue. Between Jameston Avenue and Jerrold Avenue through truck traffic is not allowed on Third Street (SECAL 2000a, AFC page 8-10.10).

Construction of the generating plant will require the use and installation of heavy equipment and associated systems and structures that will be delivered by truck. Heavy equipment will be used throughout the construction period, including trenching and earthmoving equipment, forklifts, cranes, cement mixers and drilling equipment. In addition to deliveries of heavy equipment, construction materials such as concrete, wire, pipe, cable, fuels and reinforcing steel will be delivered to the site by truck. Deliveries will also include hazardous materials to be used during construction, such as gasoline, diesel fuel, motor oil, hydraulic fluid, various lubricants, solvents, cleaners, sealers, welding flux, and paint materials.

A majority of the equipment and materials will be transported from the San Francisco area and come to the plant site by way of I-280 and US 101. Trucks traveling southbound on I-280 would exit at 25<sup>th</sup> street while those traveling northbound would exit on Cesar Chavez/Army Street. Trucks using US 101 would exit at Cesar Chavez/Army Street. This would be for both north and southbound travel.

Once on surface streets, the truck would turn north on Third Street and then right on 23<sup>rd</sup> Street to the plant site.

During the peak construction months (months 15 through 20) the maximum daily trips will consist of 10 delivery trucks and 15 heavy vehicles and trucks for a maximum of 25 truck trips per day.

### **Total Project Construction Traffic**

The total maximum daily vehicle trips to Unit 7 during its peak construction months would be approximately 300 (275 worker and 25 truck trips). This would result in the generation of 600 total daily project trips (as shown in **TRAFFIC AND TRANSPORTATION Table 3 below**).

As can be seen in **TRAFFIC AND TRANSPORTATION Table 4, Percent of Capacity Used on Local Roadways** below, the roadways in the area of the project will be able to handle the additional vehicle trips generated by the project.

The ability of a roadway to handle traffic is referred to as capacity. The capacity for a roadway is normally greater between intersections and less at intersections because the traffic flows continuously between them and only during the green phase at the intersection.

**TRAFFIC AND TRANSPORTATION Table 3**  
**Daily Trip Generation for Unit 7 at Peat of Construction Schedule**

<b>Vehicle Type</b>	<b>Maximum Project Population</b>	<b>Estimated Mode Split</b>	<b>Daily One-Way Trips</b>	<b>Maximum Daily Trips</b>
Construction Personnel	279	1.5%(1)	275	550
Delivery Trucks	N/A	N/A	10	20
Heavy Vehicles and Trucks	N/A	N/A	15	30
<b>Total</b>	<b>279</b>		<b>300</b>	<b>600</b>

(1) Korve Engineering estimates for Daily One-Way Trips assume a minor Construction Personnel mode split of 1.5% in San Francisco where transit use for construction employees is common and often at much higher levels.

Source: SEP2000DRes1, Data Response No. 44 Table 8.10-5

**TRAFFIC AND TRANSPORTATION Table 4**  
**Percent of Capacity Used on Local Roadways**

	<b>Capacity</b>	<b>Average Daily Traffic Volume</b>	<b>Percent of Capacity</b>	<b>Peak Daily Traffic Volume</b>	<b>Percent of Capacity</b>
<b>Regional Roadways</b>					
<i>Interstate 280</i>	<i>288,000</i>	<i>156,000</i>	<i>54.2 %</i>	<i>164,000</i>	<i>56.9 %</i>
<i>U.S. 101</i>	<i>384,000</i>	<i>252,000</i>	<i>65.6 %</i>	<i>262,000</i>	<i>68.2 %</i>
<b>Local Roadways</b>					
<i>Third Street</i>	<i>49,000</i>	<i>21,000</i>	<i>42.9 %</i>	<i>23,100</i>	<i>47.1 %</i>
<i>Evans Avenue</i>	<i>32,000</i>	<i>14,600</i>	<i>45.6 %</i>	<i>16,060</i>	<i>50.2 %</i>
<i>Cesar Chavez Street</i>	<i>32,000</i>	<i>12,000</i>	<i>37.5 %</i>	<i>13,200</i>	<i>41.3 %</i>
<i>Illinois Street</i>	<i>12,000</i>	<i>3,400</i>	<i>33.3 %</i>	<i>3,740</i>	<i>21.2 %</i>
<i>Cargo Way</i>	<i>24,000</i>	<i>8,759</i>	<i>36.5 %</i>	<i>9,635</i>	<i>40.1 %</i>

**Source: Percent of Capacity calculated from capacity data in Traffic and Transportation Table 2**  
**Intersection Operating Conditions**

The present percent of roadway capacity for the average daily traffic volume and during the peak daily traffic hour indicates that the roadways have the ability to carry the additional 600 daily trips without causing a significant impact.

The location of Unit 7 will result in the majority of construction related traffic using the local roadways. A small amount of equipment and materials may be delivered by rail or barge. Therefore, the capacity at the major intersections impacted by this traffic will determine if acceptable operating levels are maintained. The intersections in the area are presently operating at a LOS of C or better during the morning and evening peak periods (as shown in **TRAFFIC AND TRANSPORTATION Table 5**).

Although the increase in construction traffic did not change the LOS for the intersections reviewed and is therefore not seen as a significant impact, mitigation (see Conditions of Certification TRANS-5 and TRANS 6) has been proposed by the applicant and staff, to ensure that project related impacts are minimized. The Third Street region has a moderate level of existing congestion (i.e. LOS of C). Implementation of these

mitigation measures will ensure that area traffic levels with the project added, will not deteriorate towards LOS D, particularly at the peak hours.

**TRAFFIC AND TRANSPORTATION Table 5**  
**Level of Service for Existing and Existing Plus Project Conditions**

Intersection	Peak Hour	Existing		Existing Plus Project	
		LOS	Delay (1)	LOS	Delay (1)
Third Street and 16 <sup>th</sup> Street	a.m.	B	6.4	B	6.5
	p.m.	B	12.7	B	12.5 (2)
Third Street and 20 <sup>th</sup> Street	a.m.	A	4.4	A	4.4
	p.m.	A	4.3	A	4.3
Third Street and 25 <sup>th</sup> Street	a.m.	A	4.8	A	4.7 (2)
	p.m.	A	4.6	A	4.6 (2)
Third Street and Cesar Chavez Street	a.m.	B	13.8	B	13.7 (2)
	p.m.	B	12.9	B	12.8 (2)
Third Street and Evans Avenue	a.m.	C	15.2	C	15.2
	p.m.	C	15.6	C	15.5 (2)
Cesar Chavez Street and Evans Avenue	a.m.	C	21.3	C	21.4
	p.m.	C	24.8	C	24.9

(1) Average Intersection Delay in seconds per vehicle.

(2) Based on the 1994 Highway Capacity Manual methodology: the average stopped/delayed vehicle is estimated for each lane group and average for approaches and the intersection as a whole. Some increases in volume for a non-critical movement may cause a slight decrease in the overall intersection delay. That is the case of the existing conditions plus project scenario for the four intersections at the peak hours indicated.

Source: SEP2000DRes1, Data Response No. 42 Table 8.10-6

## OPERATIONAL PHASE

### Commute Traffic

Upon completion of the construction for facility expansion, operations will require approximately 10 additional permanent employees. This increase in operating employees will not result in significant traffic impacts for area roadways or intersections.

### Truck Traffic

Transportation and handling of hazardous substances associated with Unit 7 could result in increased roadway hazard potential. The major volume of hazardous material that will be use by the operating facility will be aqueous ammonia.

The project will result in approximately one delivery every five days (SECAL 2000a, AFC page 2-19-6). Hazardous material being transported to the site can use either I-280 or US 101, which are, designed truck routes. Trucks using either I-280 or US 101 would exit at Cesar Chavez. The trucks could then proceed east along Cesar Chavez/Army Street to Third Street. The trucks would turn left on Third Street to 22<sup>nd</sup> Street. The trucks would then turn right on 22<sup>nd</sup> Street and proceed to the plant site at 22<sup>nd</sup> and Illinois Streets (SEP2000Dres1, Data Response No. 43).

Another possible route for the trucks using either I-280 or US 101 would be to exit at Cesar Chavez. The trucks would then proceed east along Cesar Chavez/Army Street to Third Street. The trucks would proceed on Third Street to 25<sup>th</sup> Street where they would make a right turn. They would then go one block on 25<sup>th</sup> Street turning left on Illinois Street. Once on Illinois Street the trucks would proceed to the plant site at 22<sup>nd</sup> and Illinois Streets (SEP2000Dres1, Data Response No. 43).

The access from US 101 via Cesar Chavez Street is difficult for trucks. To ensure the safe transportation of hazardous material, the project owner shall require transporters of hazardous material to use I-280 with its Cesar Chavez exit unless traffic conditions dictate US 101 to be a safer route. The use of I-280 will further reduce the distance that hazardous material must be transported over the community roadways. To further ensure the safe delivery of ammonia to the facility, Mirant has indicated that they would retain the services of a licensed ammonia supply contractor that meets all of the following criteria (CCSF 2000Dreq1, Data Response No. 35):

- Truck design will be consistent with the Department of Transportation and California Highway Patrol requirements for transportation of hazardous materials.
- Drivers will be trained in hazardous material handling and emergency response procedures.

Drivers will maintain radio and telephone communication and are trained to coordinate initial evacuation efforts, if needed, and to contact the appropriate emergency response agencies in the event of a release during transit.

### **Airport Traffic**

Operations at the San Francisco International Airport and Oakland International Airport could be affected by the addition of two exhaust stacks associated with Unit 7. The two stacks will have an elevation of 205 feet above sea level; so review by the Federal Aviation Administration (FAA) will be required to determine if the stacks could result in possible obstructions to navigable airspace. The applicant intends to notify the FAA about the construction of the stacks for Unit 7 using FAA Form 7460-1, Notice of proposed Construction or Alteration (SEP2000DRes1, Data Response No. 45).

If the FAA determines that the stacks could be an obstruction in navigable air space, the project would be required to light and mark the stacks as required by FAA regulations and specifications. The FAA lighting and marking standards are set forth in the FAA Advisory Circular AC 70/7460-1, "Obstruction Marking and Lighting".

Mirant has indicated that they will light and mark the stacks in accordance with FAA regulations and specifications. If this is done, the stacks will not have a significant impact on air traffic. Staff has proposed a condition of certification to require compliance with FAA stack marking and lighting requirements.

## **LINEAR FACILITIES**

Potentially affected roadways are those adjacent to or crossed by the proposed project liner components (i.e., transmission line, natural gas pipeline, and water supply and



wastewater pipelines). The only off-site construction of linears will be the underground transmission line connecting Unit 7 to the Hunters Point Substation.

## **CONSTRUCTION PHASE**

### **Transmission Line**

The proposed underground transmission line that connecting Unit 7 to the Hunters Point Substation would be approximately 1.8 miles long. The construction of this line is scheduled to take four months. The construction time associated with any particular location along the route will be much shorter.

This underground transmission line would exit Unit 7 at the corner of Illinois Avenue and 23<sup>rd</sup> Street and proceed south to the end of Illinois Street. From this point it would continue south following an abandoned rail right-of-way to Islais Creek. Directional boring would be used to run the line under Islais Creek where it will continue along the rail right-of-way to Cargo Way. It would then run southeast along Cargo Way to Jennings Street. The underground line would then go down Jennings Street to Evans Avenue and would turn left onto Hunters Point Boulevard and continue to the Hunters Point Substation.

None of the MUNI routes are located along the route chosen for the underground cable. But, at the intersection of Evans Avenue and Jennings Street, MUNI routes 19 and 44 could be impacted, as construction at this intersection will be required for the cable route to continue to the Hunters Point Substation.

The underground cable construction could impact the street located along the route by:

- Increasing vehicle trips caused by construction workers and construction vehicles.
- Disrupt existing vehicle and bicycle traffic.
- Limiting access to properties located along the cable route.
- Delaying local transit service.
- Increasing potential traffic safety hazards to motorists, bicyclists, pedestrians, and construction workers.
- Reducing the available parking along the route during construction.

Construction of the offsite underground transmission line is scheduled to take four months and would require approximately 41 workers. The timing for the construction of the underground cable has not been set. In selecting the construction timing the applicant has indicated that they will take into account minimizing the overall construction disturbance to the community, availability of contractors, and city approval for scheduling work in street rights of way (SEP2000DRes1, Data Response No. 41).

The construction of the underground transmission line has the potential to significantly disrupt existing traffic operations at different points along its 1.8-mile route during the four-month construction period. However, mitigation measures to be applied during lane closures and the crossing of intersections for the protection of workers, traffic,

bicyclists and pedestrians, can result in the impact of the construction being reduced to less than significant (see the Mitigation Section).

### **Circulating Cooling Water Supply**

If barges and vessels used for the construction of the circulating Cooling Water Supply system must anchor or moor in a manner other than to an existing approved dock or pier, they could create a safety hazard to shipping traffic. If the construction barges or vessels must anchor or moor for construction activity away from an approved dock or pier, then they must obtain a waiver from the U.S. Coast Guard Marine Safety Office San Francisco Bay. If this is done, then the Coast Guard will be able to inform barges and vessels operating in the area such that impacts on Bay shipping traffic will be insignificant (see the Mitigation section).

## **OPERATION PHASE**

Traffic should experience no operational impact from the underground line connecting Unit 7 to the Hunters Point Substation once construction is complete. Therefore traffic impacts associated with the operation of the underground cable is insignificant.

## **CUMULATIVE IMPACTS**

Other construction activity will be occurring in the area while Unit 7 is under construction. The projects are the MUNI Third Street Light Rail project, Metro East Light Rail Maintenance and Operation Facility, the City/County of San Francisco Illinois Street Rail-Truck Bridge and the Mission Bay Redevelopment Project including the University of California San Francisco Medical Campus.

### **Third Street Light Rail**

MUNI, the City of San Francisco, and San Francisco County Transportation Authority will commence construction of the Third Street Light Rail project in 2001. The construction will be done in two phases. The first phase of the Third Street Light Rail Project is between the intersection of 4<sup>th</sup>/King and Third/22<sup>nd</sup> Streets. Phase I is scheduled to commence construction in November of this year with completion expected in August of 2003. The first phase is expected to open for service in 2004 (MUNI 2001a).

The second phase of the project along Third Street is between 22<sup>nd</sup> and Jerrold Streets. This phase is to commence construction in January of 2002 with a scheduled completion date for January of 2004. Construction of the Third Street Light Rail Project is scheduled to last for three years, but each block will be under construction for only a few weeks. MUNI is also working with the community to ensure that construction moves forward with minimum impact.

The Third Street Light Rail Line will be located two blocks west of the Potrero project. This construction activity along with Unit 7's construction could result in additional traffic congestion for the area for a short time period.

## **Metro East Light Rail Maintenance and Operation Facility**

MUNI's construction projects also include the construction of the Metro East Light Rail Maintenance and Operation Facility. This facility is for storage, maintenance, and to support the operation of MUNI's Third Street Light Rail Line. The facility is to be located south of the Potrero project on a site bounded by 25<sup>th</sup> Street, Illinois Street, Cesar Chavez Street and Louisiana Street for a total of 13 acres. The construction of the light rail yard and shops is scheduled to begin in December of 2001 with the anticipated completion in April 2004 (MUNI.2001b).

## **Illinois Street Rail and Truck Bridge**

Another project located south of the Potrero PP involves the construction of an Illinois Street Rail-Truck Bridge. This will be an intermodal bridge to improve traffic flow to the Port's lands located on the north side of the Islais Creek Channel. Construction for the bridge is planned for the latter part of 2003.

## **Mission Bay Redevelopment Project**

North of the Potrero PP is the 303-acre Mission Bay Redevelopment Project. This project is bounded on the west by I-280, south by Mariposa Street, to the north by the Mission Creek Marina area, and on the east by San Francisco Bay. The redevelopment project will include:

1. University of California San Francisco research campus currently under construction,
2. Residential community,
3. Corporate science and technology campus,
4. Forty five acres of parks and recreational areas,
5. Retail stores,
6. Five hundred room hotel,
7. Public school, and
8. Police and fire station.

The construction traffic for the redevelopment project will be accessing the area from either US 101 or I-280 to the north of the Potrero PP. Therefore, the construction activities associated with Mission Bay Redevelopment will not result in significant cumulative impacts for the community around the Potrero PP.

Unit 7 and the parties involved in the MUNI Third Street Light Rail Project, the Maintenance and Operations Facility, and the Illinois Street Rail-Truck Bridge will need to coordinate construction activities to avoid unnecessary traffic delays. The need for coordination is reflected in proposed condition of certification **TRANS-5**.

## **ENVIRONMENTAL JUSTICE**

Staff has reviewed Census 2000 information that shows the minority population is greater than 50 percent within a six mile radius of the proposed Potrero Power Plant Unit 7 (please refer to Socioeconomics Figure 1 in this Staff Analysis), and Census

1990<sup>1</sup> information that shows the low income population is less than fifty percent within the same radius.

The major traffic impact on the area will occur during the construction period. This impact is expected to be greatest for approximately nine months out of the 24-month construction schedule when the workforce exceeds 200. The travel and transportation routes that are expected to be used will avoid direct movement through much of the area included within the six mile radius of the project.

The majority of traffic is expected to use Third Street a major north south arterial in the area, US 101, or I-280. The traffic using US 101 or I-280 is expected to exit on to Cesar Chavez Street. From I-280 traffic would travel approximately ¼ of a mile to Third Street while traffic exiting from US 101 would travel approximately one mile along Cesar Chavez. The traffic would then turn left off of Cesar Chavez and go north on Third Street to 25<sup>th</sup>, 24<sup>th</sup>, or 23<sup>rd</sup> Streets before making a right turn to Illinois Street. Traffic would then travel a short distance on Illinois Street to the project site.

Cesar Chavez and Third Street are major arterial streets in the area with level of service that should be able to handle the increased traffic load. TRANS-5 and TRANS-6 have been proposed to limit the construction workforce and truck traffic travel to off peak traffic hours, to ensure that adverse traffic impacts are minimized. Based on the Traffic and Transportation analysis, staff has not identified unmitigated significant direct or cumulative impacts resulting from the construction or operation of the project, and therefore there are no environmental justice issues related to this project.

## **COMPLIANCE WITH LAWS, ORDINANCES, REGULATIONS AND STANDARDS**

The applicant has stated the intention to comply with all federal, state, and local LORS. Staff has proposed a condition of certification to ensure compliance. Staff believes such compliance will not present any unusual difficulties. The project is considered consistent with identified LORS.

## **FACILITY CLOSURE**

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### **PLANNED CLOSURE**

Planned closure occurs when the facility is closed in an anticipated, orderly manner at the end of its useful economic or mechanical life, or due to gradual obsolescence. To ensure that the planned closure will be completed in a manner that complies with all LORS, the project owner will prepare a Facility Closure Plan for submittal to the California Energy Commission for review and approval at least twelve months prior to the proposed closure. At the time of closure, all the applicable LORS will be identified and the closure plan will address how these LORS will be complied with.

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<sup>1</sup> Census 2000 data on income levels is not yet available.

## **UNEXPECTED TEMPORARY CLOSURE**

Unexpected temporary closure occurs when the facility is closed suddenly and/or unexpectedly, on a short-term basis, due to unforeseen circumstances such as:

- Disruptions in the natural gas fuel supply;
- Damage to the plant from earthquake, fire, storm or other natural disasters; and
- The project owner's decision not to operate the facility for a period of time due to economic or other reasons.

From the perspective of traffic and transportation issues, in the event of temporary facility closure, the applicant would have to comply with all applicable policies contained in the LORS section of this report with respect to transportation permits for hazardous materials and equipment deliveries and removal.

## **UNEXPECTED PERMANENT CLOSURE**

Unexpected permanent closure occurs if the project owner closes the facility suddenly and/or unexpectedly on a permanent basis. This includes unexpected closure where the owner remains accountable for implementing the on-site contingency plan. It can also include unexpected closure where the project owner is unable to implement the contingency plan, and the project is essentially abandoned. Staff assumes that the facility will either remain idle until such time that new ownership is established, or dismantling of the facility will occur. In any event, the owner will have to secure applicable transportation permits to satisfy the LORS requirements as stated in this report. In the event of temporary closure, the effects on traffic and transportation would be similar to those for normal operation of the power plant facility. In the event of permanent closure, the effects would be similar to those associated with project construction. Staff will evaluate for potential impacts and possible, mitigation for a permanent closure upon notification that such a closure will occur.

## **MITIGATION**

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The applicant has indicated its intention to comply with all LORS relating to: 1) the transport of oversized loads, 2) the transport of hazardous materials and 3) implementation of Traffic Control Programs (TCP) for various roadways when construction impedes the flow of traffic. Implementation of the applicant and staff proposed mitigation measures along with the conditions of certification will greatly reduce the associated traffic impact of the project.

## **APPLICANT'S PROPOSED MITIGATION**

Mitigation measures to reduce the disruption of vehicular, bicycle, and pedestrian traffic operations during underground cable construction.

For Hunters Point Boulevard, the lane closure strategy would follow Caltrans' traffic control system for lane closure of multilane conventional highways. This would also include the necessary sign installations, cones for lane closure and other applicable requirements that are set forth in the CCSF Department of Parking and Traffic manual, entitled Regulations for Working in San Francisco Streets.

- For Hunters Point Boulevard, northbound bicycle traffic will be given the right-of-way with protected movement along the portion of roadway undergoing construction activity, while traffic is stopped at both ends by flagmen. This will ensure additional safety to bicyclists. Depending on the volume of bicycle traffic, the delays experienced by stopped traffic on Hunters Point Boulevard would be infrequent.
- For two lane roadways, such as Illinois and Jennings Streets, the lane closure plan would follow Caltrans' traffic control system for lane closure on two lane conventional highways. This would also include the necessary traffic control devices, flagmen, a pilot car, if required, and other applicable requirements that are set forth in the CCSF Department of Parking and Traffic manual entitled Regulations for Working in San Francisco Streets.
- For locations where the installation of the underground transmission cable will be in narrow roadways, the applicant will make certain that encroachment does not occur beyond the roadway centerline. This will ensure that a minimum of one lane of the roadway is available for traffic to pass.
- For Cargo Way, which is median-divided, if at least one lane westbound cannot remain open during construction, the applicant will implement a traffic control strategy that will require the use of both lanes in the eastbound direction (on the south side) to carry bi-directional traffic. If required, the applicant will use flaggers to monitor and control traffic, especially in the event of wide and slow turning trucks into and out of adjacent driveways. Detours will be implemented, if required, for non-local/through traffic to use Third Street and Evans Avenue rather than Cargo Way.
- For the crossing of intersections by trenches, advance notification, in the form of roadside signs, will be provided to the driving public indicating that the intersection in question will be temporarily closed to traffic. The signage will include information such as the anticipated time frame/duration of closure, and the times of day of closure, if only certain hours apply. Detour signs will be provided if necessary to reroute traffic.
- After the transmission line trench has been backfilled, but before the pavement is restored, the applicant shall instruct the contractor to use steel plates to cover the exposed areas, if necessary, to allow the lane to be opened to traffic. The applicant will also comply with any additional requirement contained in the CCSF Department of Public Works manual entitled Regulation for Excavating and Restoring Streets in San Francisco while working in roadways.

Mitigation measures to reduce the obstruction of access to adjacent land use during underground cable construction.

- In situations involving temporary obstruction of access to adjacent properties, the applicant or its agent will coordinate directly with the affected property owners prior to starting construction to work out feasible and mutually convenient dates and times during which construction could take place.
- Proper advance notification will be provided to property owners to be affected, as soon as possible after certification, and then followed up by periodic updates as to

when the anticipated date of driveway obstruction is likely to occur based upon progress of the project.

- For high activity centers, such as the US Postal Service facility located on the south side of Cargo Way adequate notification will be provided. The applicant, owners or their representative will coordinate with the contractor to develop temporary access schemes for various stages of construction whereby these facilities can continue to operate with minimal disruption.

Mitigation measures to reduce traffic hazards to motorists, bicyclists, pedestrians and construction workers during underground cable construction.

- The applicant will see that lower speed limits are implemented throughout the construction/work zones and will utilize the presence of law enforcement, if necessary, to ensure that motorists obey the reduced speed limits.
- The applicant will ensure that adequate signage and appropriate traffic control devices are provided and installed in the proper locations to warn motorists of the impending construction activity within or near the roadway, as required under the CCSF Department of Public Works manual entitled Regulation for Excavating and Restoring Streets in San Francisco.
- The applicant will insure that its contractors provide adequate illumination of the work zone during conditions of limited visibility such as during inclement weather.
- Construction personnel will be required to wear reflectorized clothing/vests to ensure visibility by motorists.
- If necessary, work will be restricted to off peak hours so that the potential for conflict with greater traffic volumes is minimized.
- The applicant will ensure that construction safety practices are observed.
- In the case of a sidewalk becoming occupied by the work area, or if it is immediately adjacent to the work area, a temporary pedestrian walkway with a “canopy-type” protected zone will be constructed to maintain accessibility through the area, and to protect pedestrians from the construction activities.
- Signs will be placed along affected parking areas well in advance to warn motorists that the parking lane will be closed between certain dates.
- The applicant will coordinate with the US Postal Service facility to determine where their parked trailers can be relocated while construction work continues along sections of Cargo Way and Jennings Street. Assuming that two trench excavations are ongoing and they will occupy 200 feet each, only about five to six trailers would be affected on a given day.

## **STAFF’S PROPOSED MITIGATION**

Staff proposes additional mitigation measures to address Unit 7’s construction and trenching operation for laying the underground transmission line and for the construction of the cooling water intake and discharge structures.

- Develop a Traffic Control Plan (TCP) in consultation with the CCSF Department of Parking and Traffic, Caltrans, and other affected parties to ensure that the project will minimize its impact on traffic and to ensure safe roadway conditions.
- Provide MUNI information a minimum of seven days in advance regarding routes and rider stops that will be impacted by the construction of the underground transmission line.
- Coordinate Unit 7's construction activities with other construction activity in the area, such as, MUNI's Third Street Light Rail construction project, the Metro East Light Rail Maintenance and Operating Facility, and the Illinois Street Rail-Truck Bridge in order to develop a schedule to minimize the impact of these construction projects on the area roadways.
- Develop a roadway maintenance and repair mitigation plan with the CCSF to minimize roadway trenching or construction activities that result in accelerated road wear or other roadway damage as a result of the project construction, and to describe various repairs that will be accomplished as appropriate.
- The applicant will inform and coordinate the construction activity with the U.S. Coast Guard, Water Management Branch if it must anchor or moor any barges or vessels associated with the project in any manner other than to an existing approved dock or pier. This will include a letter to the Commanding Officer of the U.S. Coast Guard Marine Safety Office San Francisco Bay, Attention Water Management Branch, Coast Guard Island, Building 14, Alameda, California 94501-5100. This letter will include:
  1. A full description of the existing conditions/situation, to be followed up with a detail drawing of the area showing large and small scale coverage, in the drawing it should also show the location of equipment and resources clearly marked and spelled out and well defined.
  2. A statement and similar description on the work to be done and why.
  3. A time schedule as to when work will start (Date and Time), how many hours a day operations will be conducted and an estimated date and time of project completion.
  4. Listing of all persons involved in the operation, their title and job description (Person in Charge of operations, Operations Manager or Site Manager) and information on how to contact this person and their availability.
  5. A barge break away contingency plan.
  6. Listing of on-site communication cellular phone numbers and radio frequencies that are monitored. (Must be VHF-FM Marine Channels 14 and 13)
  7. A listing of all companies, agencies and groups involved in operation.



## RESPONSE TO PUBLIC AND AGENCY COMMENTS ON THE PSA

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### CITY AND COUNTY OF SAN FRANCISCO (CCSF)

**CCSF-7B:** *“Both CCSF and PG&E are planning transmission additions in the same vicinity during the same general time frame. Coordination of this work is desirable not only to reduce costs and maximize electric reliability, but also to reduce the impacts of construction work on the surrounding community and environment. Such coordination should be required, not merely encouraged. The PSA encourages the Applicant to pursue “to the extent feasible” shared trenches or other collocation strategies. The PSA requires the Applicant to submit to the Compliance Project Manager (CPM) for review evidence of good faith efforts to collocate linear facilities. The Applicant should be required to submit this evidence to the CPM for review and approval and serve a copy of the filing on CCSF. To the extent that collocation is not achieved the PSA requires the Applicant to coordinate with the city regarding construction under Islais Creek. The PSA requires the Applicant to submit to the CPM for review minutes of meeting with City Officials to verify coordination of transmission line boring under Islais Creek. The Applicant should be required to submit the minutes to the CPM submit for review and approval and serve a copy of the filing on CCSF.”*

**Response:** The FSA has several proposed conditions of certification that require the Applicant to consult with the City and County of San Francisco about their traffic concerns when developing a traffic control plan that will minimize the effect of project traffic on the local community **Trans-1, Trans-2, Trans-5, Trans-7, and Trans-8**. The traffic control plan must show how it has addressed traffic concerns raised by the parties consulted.

Since City and County personnel will be involved in these meetings staff did not feel it was necessary to require the Applicant to supply minutes of these meetings to the City and County.

**CCSF-11A:** *“Construction of the proposed project will have a significant impact on traffic and will increase traffic congestion in the area, disrupt existing businesses and conflict with the construction of the MUNI Metro Third Street Light Rail, the Metro East MUNI Maintenance Facility, the Illinois Street Rail-Truck Bridge and development of Pier 70 Mixed Use Opportunity Area. For example the Third Street Light Rail Project will eliminate one Traffic Lane in each direction along Third Street.”*

**Response:** The Commission staff was aware that a number of construction projects could be occurring in the area while the proposed Potrero Power Plan Unit 7 expansion is under construction. **Trans-5** in the FSA requires the Applicant to consult with the various parties that may have active construction projects in the area while developing its traffic control plan. Although specific construction schedules for the other projects have not been established, some of the proposed projects are expected to overlap. Staff felt that a traffic control plan for the project could be developed between the parties, which would result in little traffic impact since the use of common roadways would be minimal. An example would be the MUNI Third Street Light Rail Project which will affect traffic on Third Street and is scheduled to occur during the Unit 7 expansion

project. Its construction is scheduled to take approximately three years, but each block will only be under construction for a few weeks.

**CCSF-11A, cont.:** *CCSF agrees with the PSA condition of certification **Trans-5** that the Applicant be required to develop and implement a transportation plan. However, the condition should include the requirement that any necessary transportation infrastructure improvements, such as repaving, signalization and signage, be included in the plan. Moreover, the Applicant must be required to develop the transportation plan in conjunction with the San Francisco Port, MUNI, and the Department of Parking and Traffic.*

**Response:** **Trans-5** of the FSA requires the Applicant to develop a traffic control plan after consulting with the City and County of San Francisco, MUNI and other affected parties that must be approved by the CPM and followed by the Applicant during construction. This traffic control plan is to address such issues as signing, lighting, and traffic control devices placement if required. Any signing, lighting, and traffic control devices or approaches required of the Applicant in the approved traffic control plan, must be implemented for the Applicant to be in compliance with the Commission's permit during construction and operation.

**Trans-7** of the FSA requires the Applicant to photograph those segments of area roadways that could be affected by construction activity to show their current conditions. It also requires the Applicant to notify the City and County of San Francisco and Caltrans about the schedule for project construction in area roadways so the construction does not affect planned roadway resurfacing and/or roadway improvement projects. After completion of construction it is the Applicant's responsibility to meet with the CPM and the City and County of San Francisco to determine and receive approval for the necessary action required to return the area roadways to original or as near original conditions as possible.

**CCSF-11B:** *"In its discussion of the impacts of the power plant's operational phase the PSA demonstrates little familiarity with area traffic circulation. Truck access to the proposed project site via Cesar Chavez Street from US 101 is difficult. Direct access to eastbound Cesar Chavez Street from US 101 is impaired because of limitations in this freeway interchange. Trucks traveling to the power plant must travel on a very busy highway and through densely populated streets with numerous houses, schools and business located along the route. The staff should evaluate the safest delivery route and impose the route as a condition of certification."*

**Response:** Members of the community made staff aware of their concerns about truck traffic using US 101 and the Cesar Chavez exit. The public was particularly concerned about truck traffic associated with hazardous material. **Trans-10** in the FSA requires the Applicant to require trucks delivering hazardous material to the project to use I-280 and the Cesar Chavez Street exit unless traffic conditions indicate that use of an alternate route would be safer.

**CCSF-11C:** *"The PSA also requires the Applicant to coordinate the construction of the linear facilities with the MUNI Third Street Light Rail Project and the City's Illinois Street*

*Rail-Truck Bridge. The PSA requires the Applicant to submit a construction plan to the CPM for review and approval and to the City for review and comment at least 30 days prior to the start of demolition. If the Applicant submits a traffic control plan which has not been approved by the City, 30 days will not be sufficient time for the CPM to review, approve and implement a contested plan. If the CEC requires post-certification procedures to determine the feasibility of collocation, submission of collocation documents identified in the Land Use section of the PSA should precede submission of the traffic control plan. As currently written, the traffic control plan would be submitted 30 days prior to the commencement of demolition and the collocation documents would thereafter be submitted 30 days prior to the commencement of construction. The Applicant should be required to coordinate with the City well in advance of construction so that changes can be adopted if necessary.*

**Response:** Staff's proposed Condition of Certification **Trans-5** does require the Applicant to submit a traffic control plan for the project to the CPM 30 days prior to the start of demolition for review and approval. The condition does not require the CPM to approve the traffic control plan in 30 days.

Before a traffic control plan is approved Commission staff does consider comments from parties (e.g. the City and County of San Francisco) that would be affected by project related traffic. If the CPM determines that the plan is not appropriate, it would not approve the submitted traffic control plan until the applicant has satisfied the CPM concerns.

## **POTRERO POWER PLANT CITIZENS ADVISORY TASK FORCE (PTF)**

**PTF-3:** *"Hazardous material storage and transportation are not adequately investigated or mitigated. The PSA notes that there is a risk of fire and explosion associated with the plant's natural gas pipeline, but provides no information as to whether local emergency units are equipped to deal with the risk (e.g. has the necessary training and equipment; has developed an evacuation plan). Likewise every five days a tanker truck carrying aqueous ammonia will make its way to the plant. Yet there is no indication in the Assessment that local conditions were examined to determine the risks associated with the transport route. Instead, the PSA relies on generic data to make the assertion that there are no significant risks to hazardous materials transportation. Transportation over water should be investigated and addressed in the same way. Given the risks associated with this aspect of plant operation, local conditions should be fully investigated before a risk determination is made. PSA, Page 4.5-9, Hazardous Material Management, Natural Gas and Aqueous Ammonia and Page 4.15-9, Workers Safety Fire Protection."*

The Potrero Power Plant (Potrero PP) will require the delivery of aqueous ammonia at the expected rate of one tanker truck every five days. To minimize the risk associated with the delivery of this material to the plant site the California Energy Commission has proposed a truck route for the delivery of hazardous material as a condition of certification. The purpose of this condition was to minimize the community's exposure to the transportation of hazardous material.

Staff's analysis of the transportation of aqueous ammonia (Final Staff Assessment, Hazardous Materials Section) to the Potrero PP indicated that the risk of accident and exposure is less than the risks associated with many activities the public already accepts. The risk of exposure to significant concentrations of aqueous ammonia during transportation to the facility is felt to be insignificant because of the remote possibility of accidental release of a sufficient quantity to present a danger to the public.

To further minimize public risk associated with the transportation of aqueous ammonia to the facility the California Energy commission will require the applicant to obtain approval of the route before hazardous materials can be delivered. The current proposal for this hazardous materials truck delivery route, based on comments from the public hearing, would be use of Interstate-280 (I-280). If the truck was northbound on I-280 it would take the Cesar Chavez Street exit. After the truck exits I-280 on Cesar Chavez it will then proceed east on Cesar Chavez to Third Street. At Third Street the truck will make a left turn and travel north to 25<sup>th</sup> Street (two blocks) where it will turn right. The truck will then proceed one block to Illinois Street and turn left. The truck will then proceed to the plant entrance off of Illinois Street. The 25<sup>th</sup> Street exit would be used for those trucks traveling southbound on I-280. These trucks would travel east of 25<sup>th</sup> Street to Third Street, and then follow the same route as the trucks coming from Cesar Chavez.

The potential risks for a hazardous material accident over the route are reduced further because of the traffic controls in place. The area roadways associated with this route have traffic signals or other traffic controls in place at the intersections. This control along with the posted speed limits along the route further reduces the risk of a transportation accident.

Barge delivery of aqueous ammonia to the Potrero PP did not appear feasible because the facility does not have a pier. Therefore, any shipment of aqueous ammonia by barge would have to be barged to an existing pier and then transported by truck to the plant site. This would result in the aqueous ammonia truck traveling approximately the same or a greater distance along the local roadway system.

## **DEPARTMENT OF TOXIC SUBSTANCE CONTROL (DSTC)**

**DTSC-5:** *"Construction drawings, when completed should indicate the location of the construction contractor's hazardous waste storage area. The portion of this storage area where excess fill material will be stored must meet the requirements for waste pile storage outlined in Health and Safety Code, Chapter 6.5 and in Title 22. If the soil meets the definition of a hazardous waste and the storage area is not located on the PG&E Potrero Site, requirements for transportation of hazardous waste must be complied with or a variance from these requirements should be obtained prior to implementation."*

**Response:** The Applicant's Application for Certification – Potrero Power Plant Unit 7 Section 8.10.2.4, page 8.10-19 states that for hazardous materials that require offsite removal a licensed hazardous waste transporter would be used. Staff has also proposed FSA condition of certification **Trans-3**, that requires the Applicant to obtain permits and /or licenses for the transportation of hazardous material.

## GEORGE GUENTHER/BABETTE DREFKE (GG/BD)

**GG/BD-4:** *"The transportation of aqueous ammonia via commercial and residential streets has been resisted in several public meetings. A proposal to ship this by tanker/barge was brushed aside at the August 2, 2001 meeting. The CEC should be asked to provide a detailed feasibility study and cost analysis for this alternative."*

**Response:** See staff's response to the City and County of San Francisco comment Number 5 above.

## PIER 70 ADVISORY GROUP (P70)

**P70-8:** *"Impact: The construction necessary to expand the power plant would increase traffic congestion in the area, disrupt existing business and conflict with the construction of the MUNI Metro Third Street Light Rail on Third Street, the Metro East MUNI Maintenance Facility, the Islais Creek Truck/Rail Bridge and the development of the Pier 70 Mixed Use Opportunity Area."*

*Mitigation: Mirant should develop and implement a transportation plan including any necessary transportation infrastructure improvements (e.g. traffic control improvements including but not limited to repaving, signalization and signage) recommended by the plan, in coordination with Port, MUNI and the Department of Parking and Traffic, to address emergency access, street closures, temporary lane closures, maintaining access to adjacent property owners and business during construction, removal of on-street parking, transit access and deliveries routes."*

**Response:** The Commission staff recognizes that a number projects may be under construction in the area when the Potrero Power Plant Unit 7 is being built. The construction of Unit 7 along with other construction activity will result in additional area traffic. In order to reduce the traffic impact on the community the Applicant has proposed mitigation measures it plans to follow as shown in the Traffic Section Applicant's Proposed Mitigation section to reduce traffic impact. Commission Staff has also proposed in the Traffic section additional traffic mitigation and conditions of certification to ensure that the impact of construction traffic will be insignificant.

**Trans-5** of the proposed conditions of certification requires the Applicant to consult with Caltrans, the CCSF, MUNI, and other affected parties when preparing the traffic control plan that it submits to the CPM. **Trans-6** requires the Applicant to schedule work hours to avoid affecting the morning and evening peak hour traffic in the community. If the construction activity results in damage to the local roadways, **Trans-7** requires the Applicant to repair these surface streets to original or as near original conditions as possible.

Mitigation measures were also proposed by the Applicant and Staff to reduce the impact associated with construction of the plant and the related underground cable on traffic. Mitigation measures have been proposed to:

- Reduce the disruption of vehicular, bicycle and pedestrian traffic operations during the construction of the underground cable,

- Reduce the obstruction of access to adjacent land use during underground cable construction,
- Reduce traffic hazards to motorists, bicyclists, pedestrians, and construction workers during the construction of the underground cable.
- Development of a traffic control plan, coordinating construction activity with other construction projects, and providing information on Unit 7's construction schedule to parties that could be affected by the construction of Unit 7.

**P70-8, cont.:** *"Mirant should provide funding to the Port for the improvement the former 22<sup>nd</sup> Street right-of-way at Pier 70 in order to provide two-lane vehicular access connection with the eastern terminus of 20<sup>th</sup> street, via a loop through the Pier 70 area. The 22<sup>nd</sup> Street improvement project has been estimated to cost approximately \$50,000."*

**Response:** Staff has not recommended that the Applicant contribute funds for roadways associated with Pier 70 improvements, as 22<sup>nd</sup> Street will not be directly affected by the project. Staff has proposed that the Applicant be responsible for the repair of any roadways that are damaged by its construction activity thereby maintaining the current integrity of the area roadways.

**P70-8, cont.:** *"Mirant should contribute funding to Caltran to support their efforts to convert from diesel to electric trains."*

**Response:** In the Air quality Section of the FSA staff has proposed mitigation measures to reduce the impact of the Potrero Power Plant Unit 7 to less that significant on air quality. These measures include requiring the Applicant to use a combination of clean fuel (i.e. low sulfur diesel fuel for construction equipment), emission control devises, and emission reduction credits. Staff has also recommended that the Applicant contribute one million collars to the District's "Lower-Emission School Bus Particulate Matter Program" to mitigate the project's direct and secondary PM<sub>10</sub> emissions.

## CONCLUSIONS AND RECOMMENDATIONS

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### POWER PLANT

1. The construction phase will cause increased roadway demand resulting from the daily movement of workers and materials. This will result in traffic increases but will not cause the traffic levels on various roadways to decrease below LOS thresholds established by local and regional authorities.
2. During the construction phase, increased commuter traffic caused by the workforce could result in some traffic congestion. Mirant has proposed ways to reduce the impact of construction activity on traffic.
3. During the operational phase, increased roadway demand resulting from the daily movement of workers and materials will be minimal.

4. Compliance with federal and state standards established to regulate the transportation and handling of hazardous substances will ensure that adverse impacts from the transportation and handling of hazardous substances do not occur. There are no unusual hazards on the routes that will be used by trucks delivering aqueous ammonia.
5. The construction activity for Unit 7 will need to be coordinated with the construction activities of MUNI's Third Street Light Rail, the Metro East Light Rail Maintenance and Operating Facility projects, and the CCSF Illinois Street Rail-Truck Bridge. Coordination of the construction activity between Unit 7 and these projects will minimize the cumulative impact on area roadways.

## **LINEAR FACILITIES**

Construction of the underground transmission line could cause a temporary but significant impact on the function of area roadways. Routine construction safety and the proposed mitigation measures are expected to reduce these impacts to less than significant.

## **ENVIRONMENTAL JUSTICE**

Staff concludes that there is a minority population greater than 50 percent within the six mile radius of the project site. Staff also concludes that there will not be significant adverse impacts in the area of traffic and transportation as a result of the Unit 7 expansion project. Therefore, there are no traffic and transportation environmental justice issues.

## **RECOMMENDATION**

If the Energy Commission certifies Unit 7, staff recommends that the Commission adopt its proposed conditions of certification.

## **CONDITIONS OF CERTIFICATION**

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**TRANS-1** The project owner shall comply with Caltrans, and the City and County of San Francisco's limitation on vehicle sizes and weights. In addition, the project owner or its contractor shall obtain necessary transportation permits from Caltrans and all relevant jurisdictions for roadway use.

**Verification:** In the Monthly Compliance Reports, the project owner shall submit copies of any oversize and overweight transportation permits received during that reporting period. In addition, the project owner shall retain copies of these permits and supporting documentation in its compliance file for at least six months after the start of commercial operation.

**TRANS-2** The project owner or its contractor shall comply with Caltrans and the City and County of San Francisco's limitations on encroachment into public rights-of-way, and shall demonstrate the ability to satisfy all conditions associated with obtaining the necessary encroachment permits from all relevant jurisdictions.

**Verification:** In Monthly Compliance Reports, the project owner shall submit copies of any encroachment permits received during the reporting period. In addition, the project owner shall retain copies of these permits and supporting documentation in its compliance file for at least six months after the start of commercial operation.

**TRANS-3** The project owner shall ensure that permits and/or licenses are secured from the California Highway Patrol and Caltrans for the transport of hazardous materials.

**Verification:** The project owner shall include in Monthly or Annual Compliance Reports, copies of all permits/licenses acquired by the project owner and/or subcontractors concerning the transport of hazardous substances.

**TRANS-4** Prior to the start of construction activity in the Bay, the project owner shall ensure that the U.S. Coast Guard Marine Safety Office is informed about its construction activity in the Bay, and shall obtain the necessary anchorage waiver.

**Verification:** The project owner shall include in Monthly or Annual Compliance Reports, copies of all correspondence with the U.S. Coast Guard and copies of anchorage waivers received for work to be conducted in the Bay.

**TRANS-5** Prior to the start of demolition, the project owner shall consult with Caltrans, the City and County of San Francisco, San Francisco Municipal Railway (MUNI), and other impacted parties and prepare and submit to the Compliance Project Manager (CPM) a construction traffic control plan and implementation program. The project owner will coordinate the construction traffic control plan for the plant and its related linears with MUNI's Third Street Light Rail development, MUNI's Metro East Operating and Maintenance Facility, and the City's Illinois Street Rail-Truck Bridge project.

**Protocol:** The traffic control plan and implementation program will:

- Encourage carpools, vanpooling or other ride share programs where appropriate;
- Determine if construction work hours need to be established outside of peak traffic periods;
- Address timing of heavy equipment and building material deliveries;
- Address temporary lane closures during construction;
- Address redirecting traffic with a flagperson;
- Address signing, lighting, and traffic control device placement if required;
- Maintain access to adjacent residential and commercial property during construction;
- Ensure that construction doesn't interfere with emergency access;
- Minimize the impact on public transportation; and



- Address other issues that may be required to reduce the impact of construction traffic and to ensure safe traffic conditions for the public and construction workers.

**Verification:** At least thirty days prior to start of demolition, the project owner shall provide to the CPM for review and approval and to MUNI and the City/County of San Francisco for review and comment, a copy of its construction traffic control plan and implementation program. The construction traffic control plan and implementation program must include all appropriate requirements from the City/County of San Francisco Department of Planning and Traffic, Regulations For Working In San Francisco Street. The submittal to the CPM shall provide a copy of MUNI's and the City/County of San Francisco's comments on the plan.

**TRANS-6** The owner shall schedule construction work hours that avoid the morning and evening peak-hour traffic periods (including heavy truck traffic).

**Verification:** The project owner shall maintain workers' time cards or a log which specifies arrival and departure times and a delivery log which specifies, in part, the time and date of each delivery in the on-site compliance file.

**TRANS-7** Following completion of project construction of the power plant expansion and the associated facilities, the project owner shall meet with the CPM and the City/County of San Francisco to determine the action necessary and schedule to complete the repair of all surface streets used for project construction to original or as near original condition as possible.

**Protocol:** Prior to the start of demolition or earth moving activities, the project owner shall photograph the impacted roadway segments. The project owner shall provide the Energy Commission CPM, City and County of San Francisco, and Caltrans, if necessary, with copies of these photographs. Prior to start of demolition the project owner shall also notify the City and County of San Francisco, and Caltrans about the schedule for project construction. The purpose of this notification is to postpone any planned roadway resurfacing and/or improvement projects as appropriate until after the project construction has taken place and to coordinate construction related activities associated with other projects.

**Verification:** Within 30 days after completion of project construction, the project owner shall meet with the CPM, the City and County of San Francisco to determine and receive approval for the actions necessary and schedule to complete the repair of identified sections of public roadways to original or as near original condition as possible. The project owner shall provide to the CPM a letter from the City and County of San Francisco stating their satisfaction with the road improvements upon completion of repairs.

**TRANS-8** During construction of the expanded power plant and all related facilities, the project owner shall enforce a policy that all project related parking occurs in designated parking areas.

**Verification:** At least sixty days prior to start of demolition or earth moving activities, the project owner shall submit a parking and staging plan for all phases of project construction to the City and County of San Francisco for review and comment. The City

and County of San Francisco comments and the parking and staging plan will then be forwarded to the CPM for review and approval.

**TRANS-9** The project owner shall ensure that the exhaust stacks are marked and lighted if required by the FAA so that the stacks do not create a hazard to air navigation.

Protocol: Prior to start of grading for development of Unit 7, the project owner shall have submitted to the Federal Aviation Authority Form 7460-1, Notice of Proposed Construction or Alteration.

Verification: At least thirty days prior to start of demolition or earth moving activities, the project owner shall provide a copy of the FAA Form 7460-1 filed with the regional FAA office to the CPM. At least thirty days prior to erection of the stacks, the project owner shall provide the CPM and the City/County of San Francisco with copies of the FAA response to Form 7460-1 and supporting documents on how the project plans to comply with any stack lighting and marking requirements imposed by the FAA.

**TRANS-10** The project owner shall require that all truck traffic that delivers hazardous material to the project utilize I-280 and the Cesar Chavez Street exit, unless traffic conditions indicate that the use of an alternate route would be safer. The trucks will then proceed east on Cesar Chavez to Third Street. At Third Street the trucks will make a left turn and travel north to 25<sup>th</sup> Street where they will turn right. The trucks will then go one block to Illinois Street and turn left. The trucks will then proceed to the plant entrance off of Illinois Street.

Verification: The project owner shall include this specific route condition in its contracts for truck deliveries of hazardous material and shall report any noncompliance and any corrective measures taken to ensure future compliance in the Monthly Compliance Report.

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# TRANSMISSION LINE SAFETY AND NUISANCE

Testimony of Obed Odoemelum, Ph.D.

## INTRODUCTION

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Electrical energy from the proposed Potrero Power Plant Unit 7 (Unit 7 or “the project”) will be delivered to the Pacific Gas and Electric (PG&E) 115 kV transmission system through two separate interconnection points at (1) the existing PG&E 115 kV Potrero Substation located directly adjacent to the Potrero Power Plant and, (2) the existing PG&E Hunters Point Substation approximately 1.8 miles to the south of the project site. As detailed by the applicant, Mirant Potrero, LLC (Mirant, formerly Southern Energy Potrero, LLC), the connection to the on-site Potrero Substation will be through an overhead, single-circuit 115 kV line approximately 400 feet long and located entirely within the existing Potrero Power Plant property lines (2000a, pages 2-5 through 2-7, 2-21 through 2-23, 5-1, and Appendices C and E3). The interconnection to the Hunters Point Substation will be through two double-circuit 115 kV lines to be located underground as required by the City and County of San Francisco for such utility lines. These two new underground circuits will be necessary because the existing Potrero Substation does not have enough transmission capacity to accommodate all the new power from Unit 7. The connection to the PG&E Potrero Substation will necessitate construction of a new on-site switchyard to the east of the substation. This switchyard will be designed to accommodate power transmission for both Unit 7 and the existing Units 3 through 6 of Potrero Power Plant. Operating these project-related lines could pose a health and safety hazard preventable through compliance with specific laws, ordinances, regulations, and standards.

The purpose of this staff analysis is to assess the proposed line construction and operational plans for incorporation of the measures necessary for compliance with all applicable LORS. If such compliance were established for both the overhead and underground sections, staff would recommend approval with respect to the issues of concern in this analysis; if not, staff would recommend project revisions as appropriate.

Staff’s analysis will focus on the following issues as related primarily to the physical presence of the lines or secondarily to the physical interactions of their electric and magnetic fields:

- Aviation safety;
- Interference with radio-frequency communication;
- Audible noise;
- Fire hazards;
- Hazardous shocks;
- Nuisance shocks; and
- Electric and magnetic field (EMF) exposure.

## **LAWS, ORDINANCES, REGULATIONS AND STANDARDS (LORS)**

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Discussed below by subject area are design-related LORS applicable to the physical impacts of the overhead and underground transmission lines as proposed for Unit 7. The potential for these impacts is assessed in terms of compliance with specific federal or state regulations or established industry standards and practices. There presently are no local laws or regulations specifically aimed at the physical structure or dimensions of electric power lines to limit the impacts noted above. However, many local agencies such as the City and County of San Francisco (CCSF) require that such lines be located underground in their areas of jurisdiction mainly because of the potential for visual impacts on the city landscape.

### **AVIATION SAFETY**

Any hazard to area aircraft relates to the potential for collision with the overhead section in the navigable air space. The applicable federal LORS as discussed below are intended to ensure the distance and visibility necessary to prevent such collisions.

#### **Federal**

- Title 14, Part 77 of the Federal Code of Regulations (CFR), “Objects Affecting the Navigation Space.” Provisions of these regulations specify the criteria used by the Federal Aviation Administration (FAA) for determining whether a “Notice of Proposed Construction or Alteration” is required for potential obstruction hazards. The need for such a notice depends on factors related to the height of the structure, the slope of an imaginary surface from the end of nearby runways to the top of the structure, and the length of the runway involved. Such notification allows the FAA to ensure that the structure is located to avoid the aviation hazards of concern.
- FAA Advisory Circular (AC) No. 70/460-2H, “Proposed Construction and or Alteration of Objects that may Affect the Navigation Space.” This circular informs each proponent of a project that could pose an aviation hazard of the need to file the “Notice of Proposed Construction or Alteration” (Form 7640) with the FAA.
- FAA AC No. 70/460-1G, “Obstruction Marking and Lighting.” This circular describes the FAA standards for marking and lighting objects that may pose a navigation hazard as established using the criteria in Title 14, Part 77 of the CFR.

### **INTERFERENCE WITH RADIO-FREQUENCY COMMUNICATION**

Transmission line-related radio-frequency interference is one of the indirect effects of line operation as produced by the physical interactions of line electric fields. Since electric fields are unable to penetrate most materials including the soil, such interference and other electric field effects are not associated with underground lines. The level of any such interference usually depends on the magnitude of the electric fields involved. Because of this, the potential for such impacts could be assessed from field strength estimates obtained for the line. The following regulations are intended to ensure that such lines are located away from areas of potential interference and that any interference is mitigated whenever it occurs.

## **Federal**

- Federal Communications Commission (FCC) regulations in Title 47 CFR, Section 15.25. Provisions of these regulations prohibit operation of any devices producing force fields, which interfere with radio communications, even if (as with transmission lines) such devices are not intentionally designed to produce radio-frequency energy. Such interference is due to the radio noise produced by the action of the electric fields on the surface of the energized conductor. The process involved is known as corona discharge but is referred to as spark gap electric discharge when it occurs within gaps between the conductor and insulators or metal fittings. When generated, such noise manifests itself as perceivable interference with radio or television signal reception or interference with other forms of radio communication. Since the level of interference depends on factors such as line voltage, distance from the line to the receiving device, orientation of the antenna, signal level, line configuration and weather conditions, maximum interference levels are not specified as design criteria for modern transmission lines. The FCC requires each line operator to mitigate all complaints about interference on a case-specific basis. Staff usually recommends specific conditions of certification to ensure compliance with this FCC requirement.

## **State**

- General Order 52 (GO-52), California Public Utilities Commission (CPUC). Provisions of this order govern the construction and operation of power and communications lines and specifically deal with measures to prevent or mitigate inductive interference. Such interference is produced by the electric field induced by the line in the antenna of a radio signal receiver.

Several design and maintenance options are available for minimizing these electric field-related impacts. When incorporated in the line design and operation, such measures also serve to reduce the line-related audible noise discussed below.

## **AUDIBLE NOISE**

### **Industry Standards**

There are no design-specific federal regulations to limit the audible noise from transmission lines. As with radio noise, such noise is limited instead through design, construction or maintenance practices established from industry research and experience as effective without significant impacts on line safety, efficiency maintainability and reliability. All overhead high-voltage lines are designed to assure compliance. As with radio-frequency noise, such audible noise usually results from the action of the electric field at the surface of the line conductor and could be perceived as a characteristic crackling, frying or hissing sound or hum, especially in wet weather. Since (as happens with communications interference), the noise level depends on the strength of the line electric field, the potential for perception can be assessed from estimates of the field strengths expected during operation. Such noise is usually generated during rainfall, but mainly from overhead lines of 345 kV or higher. It is, therefore, not generally expected at significant levels from those of less than 345 kV such as the ones proposed for Unit 7. Research by the Electric Power Research

Institute (EPRI 1982) has validated this by showing the fair-weather audible noise from modern transmission lines to be generally indistinguishable from background noise at the edge of a 100-ft right-of-way.

## **NUISANCE SHOCKS**

### **Industry Standards**

There are no design-specific federal regulations to limit nuisance shocks in the transmission line environment. For modern overhead high-voltage lines, such shocks are effectively minimized through grounding procedures specified in the National Electrical Safety Code (NESC) and the joint guidelines of the American National Standards Institute (ANSI) and the Institute of Electrical and Electronics Engineers (IEEE). Nuisance shocks are caused by current flow at levels generally incapable of causing significant physiological harm. They result mostly from direct contact with metal objects electrically charged by fields from the energized line. Such electric charges are induced in different ways by the line electric and magnetic fields. As with the overhead lines for the proposed Unit 7 project, the applicant will be responsible in all cases for ensuring compliance with these grounding-related practices within the right-of-way. Staff usually recommends specific conditions of certification as necessary to ensure that such grounding is made by both the applicant and any property owners along the route.

## **FIRE HAZARDS**

The fire hazards addressed through the following regulations are those that could be caused by sparks from conductors of overhead lines or that could result from direct contact between the line and nearby trees and other combustible objects.

### **State**

- General Order 95 (GO-95), CPUC, “Rules for Overhead Electric Line Construction” specifies tree-trimming criteria to minimize the potential for power line-related fires.
- Title 14 Section 1250 of the California Code of Regulations, “Fire Prevention Standards for Electric Utilities” specifies utility-related measures for fire prevention.

## **HAZARDOUS SHOCKS**

The hazardous shocks addressed by the following regulations and standards are those that could result from direct or indirect contact between an individual and the energized line whether overhead or underground. Such shocks are capable of serious physiological harm or death and remain a driving force in the design and operation of transmission and other high-voltage lines.

### **State**

- GO-95, CPUC. “Rules for Overhead Line Construction”. These rules specify uniform statewide requirements for overhead line construction regarding ground clearance, grounding, maintenance and inspection. Implementing these requirements ensures the safety of the general public and line workers.
- GO-128, CPUC. “Rules for Construction of Underground Electric Supply and Communications Systems”. These rules specify the requirements and minimum

standards for the safe construction and operation of underground lines AC power and communication circuits.

- Title 8, CCR, Section 2700 et seq., Sections 2700 through 2974. “High Voltage Electric Safety Orders”. These safety orders establish essential requirements and minimum standards for safely installing, operating, working around, and maintaining electrical installations and equipment

### **Local**

Public Works Code, City and County and City of San Francisco. Elements of this code specify the requirements and the practices for safely undergrounding utility power lines.

### **Industrial Standards**

There are no design-specific federal regulations to prevent hazardous shocks from overhead power lines. Safety is assured within the industry from compliance with the requirements in the National Electrical Safety Code, Part 2: Safety Rules for Overhead Lines. These provisions specify the minimum national safe operating clearances applicable in areas where the line might be accessible to the public. They are intended to minimize the potential for direct or indirect contact with the energized line. Specific safety-related placement and burial requirements are similarly specified with respect to underground lines.

## **ELECTRIC AND MAGNETIC FIELD (EMF) EXPOSURE**

The possibility of deleterious health effects from electric and magnetic field exposure has increased public concern in recent years about living near high-voltage lines. Both fields occur together whenever electricity flows, hence the general practice of describing exposure to them together as EMF exposure. The available evidence as evaluated by CPUC, other regulatory agencies, and staff, has not established that such fields pose a significant health hazard to exposed humans. However, staff considers it important, as does the CPUC, to note that while such a hazard has not been established from the available evidence, the same evidence does not serve as proof of a definite lack of a hazard. Staff, therefore considers it appropriate in light of present uncertainty, to reduce such fields as feasible without affecting safety, efficiency, reliability and maintainability. For the proposed Unit 7 project, both electric and magnetic fields would be encountered around the overhead portions. However, only magnetic fields would be encountered around the underground portion since it alone can penetrate the soil from the line’s underground location.

While there is considerable uncertainty about the EMF/health effects issue, the following facts have been established from the available information and have been used to establish existing policies:

- Any exposure-related health risk to the exposed individual will likely be small.
- The most biologically significant types of exposures have not been established.
- Most health concerns are about the magnetic field.
- The measures employed for such field reduction can affect line safety, reliability, efficiency and maintainability, depending on the type and extent of such measures.



## State

In California, the CPUC (which regulates the installation and operation of high-voltage lines in California) has determined that only no-cost or low-cost measures are presently justified in any effort to reduce power line fields beyond levels existing before the present health concern arose. The CPUC has further determined that such reduction should be made only in connection with new or modified lines. It required each utility within its jurisdiction to establish EMF-reducing design guidelines for all new or upgraded power lines and related facilities within their respective service areas. The CPUC further established specific limits on the resources to be used in each case for field reduction. Such limitations were intended by the CPUC to apply to the cost of any redesign to reduce field strength or relocation to reduce exposure. Utilities not within the jurisdiction of the CPUC voluntarily comply with these CPUC requirements. This CPUC policy resulted from assessments made to implement CPUC Decision 93-11-013 of 1989.

In keeping with this CPUC policy, staff requires evidence that each proposed overhead line will be designed according to the EMF-reducing design guidelines applicable to the utility service area involved. These field-reducing measures can impact line operation if applied without appropriate regard for environmental and other local issues bearing on safety, reliability efficiency and maintainability. It is therefore, up to each applicant to ensure that such measures are applied to avoid significant impacts on line operation and safety. The extent of such applications will be reflected by the ground-level field strengths as measured during operation. When estimated or measured for the line, such field strengths can be used by staff and other regulatory agencies for comparison with fields of lines of similar voltage and current-carrying capacity. These field strengths can be estimated for any given design using established procedures. Estimates are specified for a height of one meter above the ground, in units of kilovolts per meter (kV/m), for the electric field, and milligauss (mG) for the companion magnetic field. Their magnitude depends on line voltage (in the case of electric fields), the geometry of the structures, degree of cancellation from nearby conductors, distance between conductors and, in the case of magnetic fields, amount of current in the line.

Since each new line in California is currently required to be designed according to the EMF-reducing guidelines of the utility in the service area involved, its fields are required under existing CPUC policies to be similar to fields from similar lines in that service area. A condition of certification is usually proposed by staff to ensure implementation of the design measures necessary. The applicable condition for this project is **TLSN-1**.

One of the most effective ways to reduce line fields is to closely place the lines together to allow for maximum cancellation from the interaction of all the fields involved. Such field strength cancellation occurs maximally with underground lines as they are placed within their burial casings. As a result, underground lines produce fields of much lower strengths than from their overhead counterparts of the same voltage and current-carrying capacity. Design and placement guidelines are established by the CPUC-regulated utilities in keeping with CPUC requirements for safety, efficiency and reliability. The other utilities voluntarily comply with such requirements when undergrounding is necessary. The applicant (SECAL 2000a, pages 2-29 through 2-32) has provided the details of the applicable designs, routing approach, and burial methods

as necessary to ensure the safety, efficiency, and reliability of the proposed underground portion. The strength of the surface-level magnetic fields from such underground lines diminishes more rapidly away from the line than with their overhead counterparts of the same current-carrying capacity. Because of such rapid strength diminution, such lines are unlikely to contribute significantly to residential magnetic field levels as currently located along city streets and roadways. For all such lines, staff assesses field strength acceptability mostly in terms of compliance with the applicable utility guidelines relative to safety, conductor configuration, and burial practices along the right-of-way.

## **Industrial Standards**

There are no health-based federal regulations or industry codes specifying environmental limits on the strengths of fields from power lines. However, the federal government continues to conduct and encourage research necessary for an appropriate policy on the EMF/health issue.

In the face of the present uncertainty, several states have opted for design-driven regulations ensuring that fields from new lines are generally similar to those from existing lines. Some states (Florida, Minnesota, New Jersey, New York, Montana) have set specific environmental limits on one or both fields in this regard. These limits are, however, not based on any specific health effects. Most regulatory agencies believe, as does staff, that health-based limits are inappropriate at this time. They also believe that the present knowledge of the issue does not justify any retrofit of existing lines.

Before the present health-based concern developed, measures to reduce field effects from power line operations were mostly aimed at the electric field component whose effects can manifest themselves as the previously noted radio noise, audible noise and nuisance shocks. The present focus is on the magnetic field because of the noted fact that only it can penetrate the soil, building and other materials to potentially produce the types of health impacts at the root of the present concern. As one focuses on the strong magnetic fields from the more visible overhead transmission and other high-voltage power lines, staff considers it important for perspective, to note that an individual in a home could be exposed for short periods to much stronger fields while using some common household appliances (National Institute of Environmental Health Services and the U.S Department of Energy, 1995). Scientists have not established which of these types of exposures would be more biologically meaningful in the individual. Staff notes such exposure differences only to show that high-level magnetic field exposures regularly occur in areas other than around high-voltage power lines.

## **SETTING**

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The proposed Unit 7 project will be located on approximately 6.5 acres in the south-central portion of the existing 20-acre site of the Potrero PP, which is owned by Mirant. There are existing overhead lines connecting Units 3 through 6 to the PG&E system. These lines will be removed and their support towers modified to support the new Unit 7-related lines, which will transmit the power from all the Potrero Power Plant units. The nearest residences to this overhead portion would be approximately 250 feet to the west of the proposed new on-site switchyard. Since the project site is closed to the general

public, any potentially significant EMF exposure in the overhead section would be on site with respect to workers, regulatory inspectors, or approved Mirant guests. Given the 250-ft distance to the nearest residences, the long-term EMF exposure of the present concern would be insignificant when Unit 7 and the other units are operating.

As discussed by the applicant (SECAL 2000a, pages 2-30 and 8.10-2), the route of the underground section will begin at the exit from the Potrero Switchyard at the corner of Illinois Avenue and 23rd Street. It will then continue to the end of Illinois Avenue from where it will run along an abandoned rail right-of-way directly into Islais Creek. The route will then cross underneath Islais Creek through a bored hole 20 feet to 30 feet below the creek bed. Once across Islais Creek, the route will continue down Cargo Way to Jennings Street, then southwest to Evans Avenue to its entry point at the existing PG&E Hunters Point Substation. The practice of routing underground lines along city streets, roadways or railroad rights-of-way is common among all California utilities as a way of minimizing their location near places of human habitation. Any human exposure of potential significance with respect to these Unit 7 underground lines would be the short-term exposure to passersby along the route. Such exposure patterns are common with all underground power lines and are not at the root of the present health concern.

## **PROJECT DESCRIPTION**

According to information from the applicant (SECAL 2000a, page 5-1), the overhead portion of the proposed Unit 7's lines will be made up of the components listed below.

- The single-circuit 115 kV circuit connecting the proposed new Mirant switchyard to the connection points within PG&E's Potrero Substation directly adjacent to it.
- The proposed new, 115 kV Mirant switchyard located on western side of Unit 7.

This overhead circuit will be supported on a 54-ft lattice tower allowing for a minimum vertical clearance of 10 feet as the circuit spans the space between the proposed new Mirant switchyard and the Potrero Substation. Staff considers the applicant's proposed design, construction and operation according to PG&E standards and practices (SECAL 2000a, page 2-23) as reflecting compliance with the LORS of concern in this analysis. The underground lines as described by the applicant (SECAL 2000a, pages 2-29 through 2-33) will consist of solid dielectric cables closely spaced together within two parallel underground conduits. Their point of ground entry will be within the existing Potrero Substation.

As noted by the applicant, the requirement for undergrounding significantly limits the choice of routes necessary (as with similar PG&E lines) to maximize the distance from area residences. Details of the routing, placement and burial procedures have been provided by the applicant (SECAL 2000a, pages 2-30) to reflect similarity with other underground lines within San Francisco and the other parts of the PG&E service area.

## IMPACTS

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### GENERAL IMPACTS

GO-95, GO-128, and Title 8, CCR Section 2700 et seq., as noted in the LORS section, provide the minimum regulatory requirements necessary to prevent the direct or indirect contact previously discussed in connection with hazardous shocks or aviation hazards in the overhead section. Of secondary concern are the field-related impacts manifesting as nuisance shocks, radio noise, communications interference and magnetic field exposure. The relative magnitude of such impacts would be reflected in the field strengths characteristic of a given line design. Since the field-reducing measures can affect line operations, the extent of their implementation and the related magnitude of their field strengths will vary according to environmental and other local conditions bearing on line safety, efficiency, reliability and maintainability. They will therefore, vary from one service area to the other according to prevailing conditions. It would be up to each project proponent to apply such measures to the extent appropriate for the geographic area involved. The potential for all these impacts is assessed separately as related separately to the overhead and underground sections.

### PROJECT SPECIFIC IMPACTS

#### Aviation Safety

Since the overhead lines for the proposed Unit 7 project will be located entirely on-site on existing structures not posing a significant collision hazard to area aircraft, staff does not expect these lines to pose any aviation hazard when all units are being operated. An FAA "Notice of Construction or Alteration" will not be required, according to existing regulatory criteria. Therefore, staff does not consider additional aviation-related safety measures as necessary for these lines.

#### Interference With Radio-Frequency Communication

The previously noted corona-related communications interference is most commonly caused by irregularities (such as nicks and scrapes on the conductor surface), sharp edges on suspension hardware, and other discontinuities around the conductor surface. The proposed overhead portion will be constructed according PG&E construction practices minimizing the potential for such surface irregularities. Moreover, the potential for such interference is usually of concern only for lines of 345 kV and above, and not these 115 kV lines. However, if such corona noise were to be generated, staff would expect any interference-related impacts to be minimal at the nearest residences 250 feet away. The applicant arrived at the same conclusion from their calculation of such impact potential (SECAL 2000a, page 2-53). Any specific complaints will have to be resolved by the applicant as required by FCC. Staff has recommended a specific condition of certification (**TLSN-3**) in this regard.

#### Audible Noise

As with radio noise, the low-corona design for the overhead portion of the proposed lines will, (as with all PG&E lines) minimize the potential for corona-related audible noise. This means, as reflected by the applicant's calculations (SECAL 2000a, page 2-53) that the line will not add significantly to current background noise levels in the

project area. For an assessment of the noise from all phases of the proposed Unit 7 project and related facilities, please refer to staff's analysis in the **Noise** section.

### **Fire Hazards**

As is current PG&E policy and industry practice, the fire prevention and suppression measures for the existing Potrero PP lines will continue to be implemented with respect to the proposed overhead lines. The applicant's intended compliance with the clearance-related aspects of GO-95 constitutes is an important aspect of effective compliance in this regard.

### **Hazardous Shocks**

The applicant's noted intention to implement the GO-95- and GO-128-related measures against direct contact with the energized line (SECAL 2000a, page 2-23) will serve to minimize the risk of hazardous shocks. Staff recommends condition of certification **TLSN-1** to ensure implementation of the necessary mitigation measures.

### **Nuisance Shocks**

As is current PG&E practice, the potential for nuisance shocks around the overhead and underground sections will be minimized boundaries through standard grounding practices. Staff recommends condition for certification, **TLSN-2** to ensure such grounding.

### **Electric And Magnetic Field Exposure**

For the overhead portion of the proposed lines, the applicant (SECAL 2000a, page 2-53 and Appendix P) calculated maximum field strength of 1.46 kV/m for the area around the line. This would diminish to 0.71 kV/m at the Potrero PP property boundary and 0.005 kV/m at the nearest residence 250 feet away. The maximum value for magnetic fields along the route was calculated as 843 mG, diminishing to 160 mG at the plant boundary, and a near-background level of 1.14 mG at the nearest residence. These field strengths are as staff expects for PG&E lines of similar design, voltage and current-carrying capacity. Staff has verified the accuracy of the applicant's calculations with regard to parameters bearing on field strength dissipation and exposure assessment, and recommends a specific condition of certification (**TLSN-4**) as a validation measure.

The City and County of San Francisco requires undergrounding for new lines existing lines in specified areas to avoid visual impacts as previously noted. Since the applicant has chosen the most reliable field strength-reducing configuration for the project's underground lines in keeping with San Francisco's safety requirements (reflecting current PG&E practices), staff does not consider it necessary to recommend validation measurements along the route proposed for this underground Unit 7 line.

## **CUMULATIVE IMPACTS**

The reported field strengths were calculated by the applicant for the overhead section of the proposed Unit 7 lines to factor the interactive effects of the fields from all the overhead Potrero Power Plant lines involved. Therefore, these values should be seen as representing any cumulative exposures associated with the presence of all the lines around Potrero Power Plant. As reflected in the calculated values, any such exposures would be similar to those associated with PG&E lines of similar voltage and current-carrying capacity.

## RESPONSE TO PUBLIC AND AGENCY COMMENTS ON THE PSA

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### CITY AND COUNTY OF SAN FRANCISCO (CCSF)

**CCSF-12:** *Points to the need for validation measurements of magnetic fields from the project's underground lines while expressing concern about any field strength changes that might result from changes in how the project is ultimately connected to the PG&E power grid.*

**Response:** The present CPUC policy on power line fields is to ensure that each new or modified line is designed to produce fields of the lowest intensities possible without affecting safety, efficiency, reliability and maintainability. The designs for achieving this goal have been incorporated into the standard line designs of each of the state's utilities. Undergrounding (which is mandated for new lines in San Francisco and most of the state's urban areas for visual reasons), yields the lowest field strengths possible, making it unnecessary to require the types of field strength measurements necessary for further mitigation in the case of overhead lines. Staff's only requirement for this project is that such undergrounding be made in keeping with PG&E's design and placement requirements for similar underground lines within San Francisco and the other cities in PG&E's service area. Compliance with this staff requirement would constitute compliance with present state policy, making validation measurements unnecessary.

The strengths of the electric and magnetic fields in the overhead section of the project's lines would depend on the efficiency of the field-reducing measures to be used. The ones that are proposed for this project are as required by PG&E for the proposed and similar overhead lines and should achieve the expected field strength reductions regardless of the point of interconnection to the PG&E grid.

### ELLIOT GOLIGER (EG)

**EG-2:** *States a preference for locating all high-voltage lines underground.*

**Response:** The connecting line to the Hunters Point Switchyard (which would traverse specific areas of human habitation), would be located underground as preferred by the commenter. The only part of the project's lines to be located overhead is the 400-ft section that will connect it to the existing on-site Potrero Switchyard. This section will be located entirely within the Potrero Power Plant property lines where there would be little of the long-term residential exposures at the root of the present health concern.

### KIM ROOKER (KR)

**KR-2:** *Expresses a willingness to accept an underground, project-related line but is concerned about the potential communications interference from the presence of electric fields in the area around the overhead section.*

**Response:** As noted in this analysis, the project's overhead transmission line is proposed to be designed according to PG&E guidelines limiting the strengths of the electric fields responsible for the impacts of concern to the commenter. Since this overhead portion would be located within the Potrero Power Plant's property lines (and therefore away from area residences), the potential for such interference would be low. In the unlikely event of such interference, Mirant would be responsible for any needed

mitigation as required by the FCC. The implementing Condition of Certification is **TLSN-3**.

## **CONCLUSIONS AND RECOMMENDATIONS**

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### **CONCLUSIONS**

Since electric or magnetic field health effects have neither been established nor ruled out for overhead and underground lines, the public health significance of any Potrero Power Plant-related field exposures cannot be characterized with certainty. The long-term, mostly residential magnetic exposure at the root of the present health concern will be insignificant for the overhead section as reflected by the near-background levels calculated at the nearest residences. Such low levels should serve to limit any concerns about possible health impacts. On-site worker or public exposures would be short-term and at levels expected for similar PG&E designs and current-carrying capacity. Such exposures are well understood and have not been established as posing a health hazard to humans. The underground portion will be designed and routed according to current PG&E's guidelines and will therefore, yield the lowest possible residential exposures in keeping with current CPUC policies.

The potential for nuisance shocks will be minimized through grounding and other field-reducing measures to be implemented by the applicant in keeping with current PG&E guidelines reflecting common industry practices. Since the overhead section will be supported on existing structures not posing a significant risk to area aviation, staff does not expect this section to pose a significant aviation hazard during Unit 7 operations. The use of low-corona line design together with appropriate construction practices will minimize the potential for corona noise and its related interference with radio-frequency communication in the project area.

### **RECOMMENDATIONS**

Since the 115 kV overhead portion of the proposed Unit 7 lines will be designed according to the applicable safety and field-reducing guidelines and routed entirely within the site of the proposed Unit 7 project, staff recommends approval with specific respect to the line-related impacts of concern in this analysis. If such approval is granted, staff recommends that the Energy Commission adopt the conditions of certification specified below to ensure implementation of the measures necessary to achieve the field reduction and line safety assumed by the applicant.

The underground portion is proposed as necessary for maximum field strength reduction, efficiency and distancing from buildings along the route according to applicable PG&E practices. Therefore, staff recommends approval without design or route changes.

### **CONDITIONS OF CERTIFICATION**

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**TLSN-1** The project owner shall construct the overhead portion of the proposed Unit 7 transmission line according to the requirements of CPUC's GO-95, GO-52,

Title 8, Section 2700 et seq. of the California Code of Regulations and PG&E's EMF reduction guidelines arising from CPUC Decision 93-11-013 of 1989. The underground section from Unit 7 to the Hunters Point Substation shall be constructed according to the requirements of GO-128.

**Verification:** At least 30 days before the start of ground disturbance for Unit 7's transmission line or related structures and facilities, the project owner shall submit to the Commission's Compliance Project Manager (CPM) a letter signed by a California registered electrical engineer affirming that the overhead section will be constructed according to the requirements GO-95, GO 52, Title 8, Section 2700 et seq. of the California Code of Regulations, and PG&E's EMF-reduction guidelines arising from CPUC Decision 93-11-013. The letter shall also affirm that the underground section will be constructed according to the requirements of GO-128.

**TLSN-2** The project owner shall ensure that all metallic objects along the route of the overhead section are grounded according to industry standards.

**Verification:** At least 30 days before the lines are energized, the project owner shall transmit to the CPM a letter confirming compliance with this condition.

**TLSN-3** The project owner shall take reasonable steps to resolve all complaints of interference with radio or television signals from operation of the overhead section of the proposed lines.

**Verification:** All reports of line-related complaints shall be summarized along with related mitigation measures for the first five years, and provided in the annual compliance report to the CPM.

**TLSN-4** The project owner shall engage a qualified consultant to measure the strengths of the line electric and magnetic fields from the overhead section of the proposed lines before and after they are energized. Measurements shall be made at points on-site and at the nearest residence for which field strength estimates were provided.

**Verification:** The project owner shall file copies of the pre-and post-energization measurements with the CPM within 60 days after completion of the measurements.

## REFERENCES

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SECAL (Southern Energy California) 2000a. Application for Certification, Volumes I and II, Potrero Power Plant Unit 7 Project (00-AFC-4). Submitted to the California Energy Commission on May 31 2000.

Electric Power Research Institute (EPRI) 1982. Transmission Line Reference Book: 345 kV and Above.

Energy Commission Staff 1992. High Voltage Transmission Lines: Summary of Health Effects Studies. California Energy Commission Publication, P700-92-002.



National Institute of Environmental Health Services 1998. An Assessment of the Health Effects from Exposure to Power-Line Frequency Electric and Magnetic Fields. A Working Group Report, August, 1998.

# **VISUAL RESOURCES**

Testimony of Michael Clayton

## **INTRODUCTION**

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Energy Commission staff analyzed both the potential visual impacts of the proposed Potrero Power Plant Unit 7 Project (Unit 7) and the compliance of the project with applicable laws, ordinances, regulations, and standards. Staff concludes that the proposed project would cause adverse but not significant visual impacts. However, effective implementation of the Applicant and staff proposed mitigation measures, and staff's recommended conditions of certification, would reduce the adverse visual impacts that would be caused by the project. Staff also concludes that the proposed mitigation, as augmented by staff's recommended conditions of certification, would bring the project into compliance with applicable laws, ordinances, regulations, and standards regarding visual resources.

Also, staff reviewed the demographic information provided in the Socioeconomics section of this FSA in relation to the location(s) around the proposed power plant that have the potential to receive a significant visual resources impact. Based on information collected during the course of this analysis from community members and from governmental sources, staff has determined that, with the implementation of mitigation proposed by the Applicant and mitigation and conditions of certification proposed by staff, there will not be an unmitigated disproportionate impact on a minority or low-income population.

## **INTRODUCTION**

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Visual resources are the natural and cultural features of the environment that can be viewed. This analysis focuses on whether Unit 7 would cause significant adverse visual impacts and whether the project would be in compliance with applicable laws, ordinances, regulations, and standards. The determination of the potential for significant impacts to visual resources resulting from the proposed project is required by the California Environmental Quality Act (CEQA) Public Resources Code section 21000 et seq. and Title 20, California Code of Regulations, section 1701 et seq.<sup>1</sup> The determination of the compliance of the proposed project with applicable laws, ordinances, regulations, and standards is required by Public Resources Code section 25525.

## **ORGANIZATION OF ANALYSIS**

This analysis is organized as follows:

- Description of analysis methodology;
- Description of applicable laws, ordinances, regulations and standards;
- Description of the project aspects that may have the potential for significant visual impacts;

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<sup>1</sup> The California Energy Commission's power plant siting regulations.

- Assessment of the visual setting of the proposed power plant site and linear facility routes;
- Evaluation of the visual impacts of the proposed project on the existing setting;
- Evaluation of compliance of the project with applicable laws, ordinances, regulations, and standards;
- Identification of measures needed to mitigate any potential significant adverse impacts of the proposed project and to achieve compliance with applicable laws, ordinances, regulations, and standards.
- Conclusions and Recommendations; and
- Proposed Conditions for Certification.

## **ANALYSIS OF METHODOLOGY**

Visual resources analysis has an inherent subjective aspect. However, the use of generally accepted criteria for determining impact significance and a clearly described analytical approach aid in developing an analysis that can be readily understood.

### **Significance Criteria**

Commission staff considered the following criteria in determining whether a visual impact would be significant.

#### **State**

The CEQA Guidelines defines a “significant effect” on the environment to mean a “substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the project including...objects of historic or aesthetic significance. (Cal. Code Regs., tit.14, § 15382.)

Appendix G of the Guidelines, under Aesthetics, lists the following four questions to be addressed regarding whether the potential impacts of a project are significant:

1. Would the project have a substantial adverse effect on a scenic vista?
2. Would the project substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?
3. Would the project substantially degrade the existing visual character or quality of the site and its surroundings?
4. Would the project create a new source of substantial light or glare that would adversely affect day or nighttime views in the area?

#### **Local**

Energy Commission staff considers any local goals, policies, or designations regarding visual resources. Conflicts with such laws, ordinances, regulations, and standards can constitute significant visual impacts. See the section on Applicable Laws, Ordinances, Regulations, and Standards.

## **Professional Standards**

Professionals in visual impact analysis have developed a number of questions as a means of evaluating the potential significance of visual impacts (see Smardon 1986). The questions listed below address issues commonly raised in visual analyses for energy facilities. Staff considers these questions in assessing whether a project would cause a significant impact in regard to any of the four CEQA criteria listed above.

- Will the project substantially alter the existing viewshed, including any changes in natural terrain?
- Will the project deviate substantially from the form, line, color, and texture of existing elements of the viewshed that contribute to visual quality?
- Will the project eliminate or block views of valuable visual resources?
- Will the project result in significant amounts of backscatter light into the nighttime sky?
- Will the project be in conflict with directly identified public preferences regarding visual resources?
- Will the project result in a significant reduction of sunlight, or the introduction of shadows, in areas used extensively by the community?
- Will the project result in a substantial and persistent visible exhaust plume?

## **View Areas and Key Observation Points**

The proposed project is visible from a number of areas in the project region. Energy Commission staff evaluated the visual impact of the project from each of these areas. Staff used Key Observation Points<sup>2</sup>, or KOPs, as representative locations from which to conduct detailed analyses of the proposed project and to obtain existing conditions photographs and prepare visual simulations. KOPs are selected to be representative of the most critical locations from which the project would be seen. However, KOPs are not the only locations that staff considered in each view area.

## **Evaluation Process**

For each view area, staff considered the existing visual setting and the visual changes that the project would cause to determine impact significance. Staff conducted a site visit and concluded that five of the KOPs presented in the AFC were appropriate for this analysis. However, staff also requested that KOP 4 be revised to provide a less obstructed view of the site from the Hunter's Point neighborhood. Staff also requested that four new KOPs be added to assess the potential visual impacts on the following areas and facilities: (a) the Potrero Hill neighborhood near Watchman Way (KOP 1), (b) Pacific Bell Park (KOP 7), (c) Aqua Vista Park (KOP 8), and recreational boaters on San Francisco Bay (KOP 9). The results of staff's analysis are summarized in the Visual Analysis Summary presented in VISUAL RESOURCES Appendix A and discussed in detail in subsequent sections of this analysis. Existing conditions photographs and photosimulations from each KOP are presented with all figures in VISUAL RESOURCES Appendix B.

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<sup>2</sup> The use of KOPs or similar view locations is common in visual resource analysis. The US Bureau of Land Management and the US Forest Service use such an approach.

## **Elements of the Visual Setting**

To assess the existing visual setting, staff considered the following elements:

### ***Visual Quality***

Visual quality is an expression of the visual impression or appeal of a given landscape and the associated public value attributed to the visual resource. This analysis used an approach that considers visual quality as ranging from outstanding to low. Outstanding visual quality is a rating reserved for landscapes that would be what a viewer might think of as “picture postcard” landscapes. Low visual quality describes landscapes that are often dominated by visually discordant human alterations, and do not provide views that people would find inviting or interesting (Buhyoff et al., 1994).

### ***Viewer Concern***

Viewer concern is a measurement of the level of viewer interest regarding the visual resources in an area. Official statements of public values and goals reflect viewers’ expectations regarding a visual setting. This analysis also employed land use as an indicator of viewer concern. Uses associated with 1) designated parks, monuments, and wilderness areas, 2) scenic highways and corridors, 3) recreational areas, and 4) residential areas are generally considered to have high viewer concern. Travelers on other highways and roads, including those in agricultural areas, may have moderate viewer concern depending on viewer expectations as conditioned by regional and local landscape features. Commercial uses, including business parks, typically have low-to-moderate viewer concern, though some commercial developments have specific requirements related to visual quality, with respect to landscaping, building height limitations, building design, and prohibition of above-ground utility lines, that indicate high viewer concern. Industrial uses typically have the lowest viewer concern because workers are focused on their work, and generally are working in surroundings with relatively low visual value.

### ***Viewer Exposure***

The visibility of a landscape feature, the viewing distance to the landscape feature, the number of viewers, and the duration of the view all affect the exposure of viewers to a given landscape feature. Visibility is highly dependent on screening and angle of view. The smaller the degree of screening and/or the closer the feature is to the center of the view area, the greater its visibility is. Increasing distance reduces visibility. Viewer exposure can range from low values for all factors, such as a partially obscured and brief background view for a few motorists, to high values for all factors, such as an unobstructed foreground view from a large number of residences.

### ***Visual Sensitivity***

The overall level of sensitivity of a view area to impacts due to visual change is a function of visual quality, viewer concern, and viewer exposure and can range from low to high.

## **Types of Visual Change**

To assess the visual changes that the project would cause, staff considered the following factors:

### ***Contrast***

Visual contrast describes the degree to which a project's visual characteristics or elements (consisting of form, line, color, and texture) differ from the same visual elements established in the existing landscape. The degree of contrast can range from low to high. The presence of forms, lines, colors, and textures in the landscape similar to those of a proposed project indicates a landscape more capable of accepting those project characteristics than a landscape where those elements are absent. This ability to accept alteration is often referred to as visual absorption capability and typically is inversely proportional to visual contrast.

### ***Dominance***

Another measure of visual change is project dominance. Dominance is a measure of a feature's apparent size relative to other visible landscape features and the total field of view. A feature's dominance is affected by its relative location in the field of view and the distance between the viewer and the feature. The level of dominance can range from subordinate to dominant.

### ***View Blockage***

View blockage describes the extent to which any previously visible landscape features are blocked from view by the project. Blockage of higher quality landscape features by lower quality features causes adverse visual impacts. The degree of view blockage can range from none to high.

## **LAWS, ORDINANCES, REGULATIONS AND STANDARDS**

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The following discussion of Federal, State, and Local laws, ordinances, regulations, and standards is based on Section 8.11.1.4.3 (LORS) of the Applicant's Amendment to the Application (MIRANT 2001g, AFC Amendment pages 8.11-14 through 21).

### **FEDERAL**

The proposed project is located on private land. Therefore, the project is not subject to federal regulations pertaining to visual resources.

### **STATE**

The existing power plant, located near the shore of San Francisco Bay, falls under the jurisdiction of multiple planning agencies. At the state level, there is a comprehensive plan for the conservation and development of San Francisco Bay and land within 100 feet of its shoreline (San Francisco Bay Plan). This plan, adopted as state law under the McAteer-Petris Act (1969), is maintained and implemented by the Bay Conservation and Development Commission (BCDC). Also, Caltrans has designated the Bay Bridge (and portions of I-280) as eligible for State Scenic Highway designation (MIRANT 2001g, AFC Amendment p. 8.11-14). If these facilities become state designated scenic highways, the local jurisdiction would be required to enact a scenic corridor protection program that protects and enhances scenic resources. A properly enforced program can mitigate the effects of uses that might otherwise detract from the scenic values of the corridor landscape. A corridor protection program will typically stipulate specific siting, landscaping, and screening requirements; as well as require appropriate

structural characteristics and surface treatments to make the development more compatible with the existing environment.

The San Francisco Bay Plan includes policies for development along the shoreline concerning appearance, design, and visual access to the Bay. The existing power plant is partially under BCDC jurisdiction. The proposed project includes structures within 100 feet of the shoreline (the new cooling water intake and discharge structure). The policies of the San Francisco Bay Plan relevant to the protection and enhancement of scenic resources are applicable to the proposed project. A list of these policies and an assessment of the project's consistency with these policies is presented in a later section of this analysis.

## **LOCAL**

The project site is located within the City and County of San Francisco. Therefore, the project would be subject to local laws, ordinances, regulations, and standards pertaining to protecting and maintaining visual character and quality for San Francisco. Applicable laws, ordinances, regulations, and standards are from the Port of San Francisco Waterfront Plan (1999a), San Francisco Master Plan (1988), the Central Waterfront Area Plan (1990), and the San Francisco Planning Code (1999b).

The Port of San Francisco, a department of the City and County of San Francisco, is responsible for managing the shoreline of San Francisco Bay from Hyde Street Pier in the north to India Basin in the south. The Port's Waterfront Plan is the policy document governing this shoreline area (CCSF, 1999a). The goal of the Waterfront Plan that relates to visual quality states, "The design of new developments should be of exemplary quality and should highlight visual and physical access to and from the Bay, while respecting the waterfront's rich historic context and the character of neighboring development." The Waterfront Plan includes a Design and Access Element that contains policies relevant to visual quality and the proposed project.

The San Francisco Master Plan (Master Plan) contains goals, objectives, and policies for the protection and enhancement of visual resources. Three elements of the Master Plan include relevant objectives and policies: the Commerce and Industry Element, the Recreation and Open Space Element, and the Urban Design Element. Additionally, the project site is covered under a specific plan, the Central Waterfront Area Plan (CCSF, 1990). Within the Commerce and Industry Element, the Master Plan outlines a goal for maintaining San Francisco's unique and attractive environment. The Urban Design Element specifies the majority of the objectives and policies for recognizing, enhancing, and conserving the special physical characteristics of the city.

The Central Waterfront Area Plan specifies an objective for urban design that is relevant to visual resources. The objective is to achieve an aesthetic urban form consistent with the economic development of the sub-areas. Several policies support that objective.

The San Francisco Planning Code (CCSF 199b) sets height and bulk limits for structures throughout the city (Sections 260 and 270). The proposed project would be exempt from height limits according to Section 260 (b)(2)(M), which states, "The following shall be exempt...structures and equipment necessary for the operation of

industrial plants, transportation facilities, public utilities, and government installations, where otherwise permitted in this Code and where such structures and equipment do not contain separate floors..." The proposed project would also be exempt from bulk limits (Sections 260(a)(3), 270(a), and 270(b)).

There is also the 49-mile Scenic Drive that travels throughout San Francisco and passes through the project vicinity (along Indiana Street and I-280). This Scenic Drive, for the most part, is not a state designated or eligible scenic highway. However, it is a well-known, signed, and frequently traveled tourist route. The CCSF Planning Department does not have specific regulations applicable to the 49-Mile Scenic Drive (Purvis 2000), rather; certain roadway segments are regulated through the Planning Code. Restrictions for these designated roadway segments are limited to signage. The segments of the 49-Mile Scenic Drive near the project site, along Indiana Street and I-280, are not specified in the Planning code.

A list of the specific local policies applicable to the proposed project and an assessment of the project's consistency with those policies is presented in a later section of this analysis.

## PROJECT DESCRIPTION

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The following section describes the aspects of the project that may have the potential for significant visual impacts. These facilities include the power plant, two 180-foot high HRSG exhaust stacks, and related facilities; the plant switchyard; and the cooling water intake structure. The route locations of the two 115 kV transmission cables that would interconnect the proposed switchyard with the existing Hunter's Point Substation are also described below even though they would be installed underground within existing right of ways and city streets, and are not expected to cause significant visual impacts.

The proposed project would also include the removal of the existing Station A complex (105 feet high, 420 feet long, 106 feet wide) consisting of the turbine hall, gate house, meter house, compressor building, and pump house (**VISUAL RESOURCES Figure 1** [SECAL 2001a, Figure 2-10C], also see SECAL 2000b, Figure 2-2A). A prefabricated metal shop building located west of the meter house and compressor building would also be removed.

## LOCATION

The power plant would be located at the existing Mirant California Potrero Power Plant site. The site is bounded by Illinois Street on the west, 22<sup>nd</sup> Street on the North, 23<sup>rd</sup> Street on the south, and San Francisco Bay on the east. (see **PROJECT DESCRIPTION Figure 2**. The new facilities would be situated immediately west of the existing Unit 3 power plant and stack and east of the existing switchyard (see **VISUAL RESOURCES Figure 2** [SECAL 2000a, AFC Figure 8.11-3], and **PROJECT DESCRIPTION Figure 5**, and **PROJECT DESCRIPTION Figure 6**)

## POWER PLANT AND ASSOCIATED FACILITIES

The most visible features of the proposed project include two 60-foot tall air inlets to the combustion turbine generators (CTGs), the 60-foot tall steam turbine generator, the 94-



foot tall heat recovery steam generator (HRSG) trains, and two 180-foot tall HRSG stacks (see **PROJECT DESCRIPTION Figure 7** [MIRANT 2001g, AFC Amendment Figure 2-3]). The Applicant has stated that a “Surface treatment of the HRSG buildings would be provided so as to reduce their visual contrast and utilitarian appearance, and improve their compatibility with the historic and developing character of the industrial waterfront neighborhood. The HRSG stacks would be treated with a low reflectance surface and colored to darken them to a medium value, similar to the colors of the existing stack (MIRANT 2001g, AFC Amendment p. 8.11-26).” Other features associated with the project include parking areas, fencing, and lighting (which is addressed in a separate section later in this analysis).

## **SWITCHYARD**

The new switchyard would be located immediately west of the steam turbine generator facilities and east of the existing switchyard. Components of the new switchyard would appear similar to those of the existing switchyard with some structures extending to a height of 42 feet.

## **COOLING WATER INTAKE STRUCTURE**

The cooling water intake structure would be a low rectangular building along the water line of the Bay as illustrated in **PROJECT DESCRIPTION Figure 8** **PROJECT DESCRIPTION Figure 9**, and **VISUAL RESOURCES Figure 3** (SECAL 2000a, AFC Figure 7-2). The structure would be 33 feet high and approximately one third of the structure would be visible at low tide.

## **ELECTRICAL TRANSMISSION INTERCONNECTION**

**PROJECT DESCRIPTION Figure 2** shows the proposed route of the two underground 115 kV electric transmission cables that would interconnect the Unit 7 switchyard with the Hunters Point Substation. For the most part, the route would follow existing streets and right of ways. The underground route exits the Potrero switchyard at the corner of Illinois Avenue and 23<sup>rd</sup> Street. It continues south down Illinois Avenue to its end, then follows the abandoned rail right-of-way directly to Islais Creek. The route then crosses under Islais Creek via directional boring. Once across Islais Creek, the route continues down Cargo Way to Jennings Street; turns southwest on Jennings Street to Evans Avenue; and then passes down Evans Avenue to the entrance of the Hunters Point Substation.

## **SETTING**

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### **REGIONAL LANDSCAPE**

The proposed project would be located along the western shore of San Francisco Bay within the highly urbanized City and County of San Francisco. The San Francisco Peninsula is bordered by the Pacific Ocean on the west and San Francisco Bay on the north and east. The urban environment along the peninsula consists of industrial, commercial, residential, and recreational uses as well as open space and considerable transportation infrastructure in the form of streets, highways, and public transit facilities. Coastal hills and level Bay landscapes are dominant features within the region. As

stated in the AFC, "The Ocean and Bay are often the focus of views from the hills and shoreline areas, as well as places of human activity. Islands, such as Yerba Buena Island and the major bridges crossing the Bay also form distinctive and well-known features. The East Bay Hills define the regional backdrop on the eastern side of the Bay. The hills within San Francisco provide enclosure on the west side of the Bay, form additional focal features, and often define local neighborhoods" (SECAL 2000a, AFC p. 8.11-1).

## POWER PLANT REGIONAL VIEWSHED

**VISUAL RESOURCES** Figures 4 and 5 show the potential areas from which the existing and proposed power plant facilities might be seen (viewshed). As is apparent from the two figures, the areas of influence for the two projects (the areas from which the existing 305-foot stack and the proposed 180-foot stacks could be seen) are essentially the same and extend out to five miles. The areas depicted on the figures are considered "potential" because these viewshed areas were generated by digital terrain modeling that does not take into consideration the screening effects of buildings, vegetation, and topography. As such, the figures are not intended to be representational viewshed maps. However, the distance boundaries do provide a reasonable indication of the maximum area of visual influence for both the existing and proposed facilities. The distance zones as defined are **foreground** (0 to 1/2 mile), **middleground** (1/2 to 3 miles), and **background** (beyond 3 miles [and shown on the maps only up to 5 miles]). Within these zones of influence are a number of potentially affected neighborhoods and districts. Three outlying areas have limited opportunities for views of the project site (primarily the Unit 3 stack) and include central San Francisco, the western highlands, and south San Francisco.

Views of the project site from Central San Francisco, including the Financial District, Nob Hill, Telegraph Hill, and the Civic Center, are primarily limited to the occupants of upper floors of high-rise and mid-rise structures with open, unobstructed views to the south and southeast. At viewing distances of approximately 2.5 to 3.5 miles, there are minimal viewing opportunities given the substantial screening provided by other high rise structures nearby and south of Market Street.

The western highlands include the Western Addition, Pacific Heights, Haight Ashbury, Twin Peaks, Diamond Heights, and Noe Valley with potential viewing distances ranging from 2.5 to 4 miles. These areas consist mainly of dense residential development. Views of the site are limited to the upper floors of two to four story structures on elevated parcels with unobstructed east to south views. Again, such viewing opportunities are relatively few given the considerable amount of screening that would occur due to taller vegetation and intervening structures.

From southern San Francisco, including the Outer Mission and Excelsior Districts, open views of the site are relatively few at distances of approximately 2.5 to 4.5 miles and are generally limited to north to east facing views from the upper stories of the residential, commercial, and industrial properties, or larger open space areas on higher ground. Screening would be substantial due to the close proximity of surrounding buildings, utilities, and vegetation.

Most views of the site are limited to viewing areas within two miles of the site. Within this foreground to middleground viewing distance, land uses are varied and typical of an urban setting. Views are available to residents; occupants of commercial and industrial facilities; motorists on local roads, Interstate 280, and the western end of the San Francisco – Oakland Bay Bridge (slightly over two miles); users of local parks and recreation areas and facilities; and boaters on San Francisco Bay. Within this viewing distance there are a number of potentially sensitive viewing areas, which are discussed later in this analysis.

## **IMMEDIATE POWER PLANT VICINITY**

Within the project vicinity (generally two miles or less) foreground to middleground views of the site are primarily limited to the upper elevations of the surrounding terrain or to the upper floors of multi-storied structures where views toward the site are open and unobstructed by intervening vegetation or structures. Within this area, the existing Unit 3 stack is a prominent visual feature. The visual character of the project vicinity is that of a complex and dense urban environment with a mixture of land uses and a variety of structural heights and viewing elevations. Many views of the site are backdropped by dramatic, panoramic scenes of more distant cityscapes (downtown San Francisco to the north) rolling ridgelines (to the west, south, and more distant east), and the open waterscape of San Francisco Bay (to the east).

Unit 7 would be located within the boundaries of the existing Potrero Power Plant on a site that is occupied by older industrial structures and disturbed or paved areas. The vegetation on the site primarily consists of scattered low shrubs and weedy herbaceous species, which do not provide any screening of the site's industrial visual character. The existing power plant consists of one exhaust stack (305 feet high); a steel building immediately north of the stack (125 feet high); three large fuel oil storage tanks along the north side (140 feet in diameter x 50 feet high, 157 feet in diameter by 48 feet high, and 167 feet in diameter by 65 feet high); and an electrical switchyard and steel lattice structures. The site also contains a large brick generator hall (68 feet high) and the 105-foot tall Station A complex which is to be demolished (SECAL 2000a, AFC pp. 8.11-6 and 5). Other onsite ancillary facilities include a machine shop, electric shop, warehouse, control room, and treated water tank.

The shoreline immediately north and south of the site is developed with industrial uses, primarily associated with maritime commerce. These industrial developments include large paved areas for parking and some tall structures such as cargo-loading cranes. The industrial areas immediately north of the site include large shipping facilities with tall industrial structures in the Central Basin. Farther north (approximately 1.5 miles), the new baseball stadium, Pacific Bell Park, forms a landmark structure. Beyond that, the skyline of San Francisco's high-rise downtown core forms a major regional landmark (SECAL 2000a, AFC p. 8.11-6).

Immediately south of the site within the industrial area, there is also a small park, Warm Water Cove Park. Farther south, beyond the park, there are disturbed vacant areas, the North Container Terminal, the India Basin industrial/business park area, and Hunters Point, a prominent ridge and residential neighborhood. The existing Hunters

Point Power Plant is visually prominent in this area, with its own stack and related facilities (SECAL 2000a, AFC p. 8.11-6).

The area immediately to the west of the site, along Third Street, is dominated by industrial and commercial uses and scattered residential uses. Just west of Third Street, single-family and multi-family residential uses become more prominent, particularly west of I-280, with dense residential areas at the higher elevations of Potrero Hill. Other elevated residential areas in the vicinity include the Hunters Point area, Bayview district, and Bernal Heights, all to the south and southwest of the site (SECAL 2000a, AFC p. 8.11-6).

Views from Interstate-280 to the west of the site and from Interstate-80 and the Bay Bridge (westbound) to the north of the site are relatively brief due to the high rate of vehicle speeds. Portions of I-280 and I-80 along the Bay Bridge have been identified as Eligible for State Scenic Highway designation.

## **ELECTRICAL TRANSMISSION INTERCONNECTION**

The proposed electrical transmission interconnection is located within the power plant vicinity described above. Landscapes along the underground route consist primarily of maritime industrial and industrial park scenes in close proximity to the shoreline.

## **CONSTRUCTION LAYDOWN AREAS**

The proposed construction laydown areas (all within the existing power plant boundaries) are located within the power plant vicinity, described above.

## **VIEWING AREAS AND KEY OBSERVATION POINTS**

Staff evaluated the visual setting and proposed project in detail from several key viewing areas including: (1) Potrero Hill, (2) I-280/Third Street Neighborhood, (3) 25<sup>th</sup> Street/Indiana Street Neighborhood, (4) Hunters Point, (5) Bernal Heights, (6) Bayview, (7) Pacific Bell Park, (8) Aqua Vista Park, and (9) San Francisco Bay. Each of these key viewing areas are shown on **VISUAL RESOURCES Figure 6** along with the locations of the nine key observation points (KOPs) used to represent these areas. A Visual Analysis Data Summary detailing the analytical results for each KOP is provided in VISUAL RESOURCES Appendix A and their existing conditions photographs and photosimulations are presented in VISUAL RESOURCES Appendix B. A discussion of the visual setting for each KOP is presented in the following paragraphs.

### **KOP-1 – Potrero Hill; Watchman Way Neighborhood**

KOP 1 represents the view to the east from the cul-de-sac on Watchman Way. This neighborhood is the most visually impacted residential neighborhood on Potrero Hill. From this location, the view toward the site is elevated, over a complex urban, industrial landscape that also encompasses an expansive, panoramic view of San Francisco Bay and the East Bay Hills beyond (see **VISUAL RESOURCES Figure 7A**).

### **Visual Quality**

The view from KOP 1 is dominated by foreground urban, industrial structures along the San Francisco eastern waterfront. The existing power plant is a prominent foreground

visual element that is backdropped by San Francisco Bay and the East Bay Hills. The existing Unit 3 stack provides a prominent vertical form (and lines) in a landscape that is dominated by horizontal structural forms and lines. The panoramic view of shoreline features backdropped by the Bay and East Bay Hills encompasses a diverse landscape with increased visual interest that partially offsets the lower quality of the shoreline industrial development. The contrasting lighter structural colors and blues of the Bay and sky also add variety and interest. Visual quality is moderate.

### **Viewer Concern**

The power plant site would be visible from the numerous residences along the east side of Potrero Hill in the vicinity of Watchman Way. Residents generally anticipate open, frontal views of a highly urbanized, industrial waterfront landscape. However, new industrial features that would further detract from the panoramic views of the Bay and East Bay Hills would be perceived as detracting from the available vista views. Therefore, viewer concern is high.

### **Viewer Exposure**

Site visibility is high in that the view of the site from KOP 1 is open and unobstructed at a foreground viewing distance of approximately 0.5 mile. Although the number of viewers is low, the duration of view from the residences is extended. Viewer exposure is moderate.

### **Overall Visual Sensitivity**

For residents on the east side of Potrero Hill, the moderate visual quality and viewer exposure, combined with a high viewer concern all contribute to an overall moderate-to-high visual sensitivity.

## **KIP 2 – Potrero Hill; 20th and Mississippi Streets Neighborhood**

KOP 2 represents the view from the Potrero Hill residential neighborhood in the vicinity of 20th and Mississippi Streets. This neighborhood occurs along a northeast topographic spur of Potrero Hill that is lower in elevation than the area represented by KOP 1. Views from this area encompass the I-280/Third Street residential area between Potrero Hill and Interstate 280 (I-280) to the east, the waterfront industrial areas, San Francisco Bay, and the more distant East Bay Hills.

### **Visual Quality**

The southeasterly view from KOP 2 encompasses a foreground panoramic scene dominated by the geometric block forms of dense residential development and waterfront industrial uses, backdropped by the broad, horizontal expanse of San Francisco Bay and the East Bay Hills beyond (see **VISUAL RESOURCES Figure 8A**). Though structural coloration is varied, the bluish hues of sky and water predominate. The contrast between land and water features contributes visual variety and interest to a landscape primarily of urban residential and industrial character. Visual quality is moderate, reflecting a balance between a prominent urban landscape and a panoramic background of predominantly natural features.

## **Viewer Concern**

The power plant site is visible from the numerous residences along the lower portions of Potrero Hill in the vicinity of 20th Street and Mississippi Street. While residents generally anticipate open, frontal views of a highly urbanized, industrial waterfront landscape, any new industrial features that would further detract from, or block the panoramic views of the Bay and East Bay Hills would be perceived as detracting from the more scenic aspects of these views which are less dramatic than the higher elevation views from KOP 1. Viewer concern is moderate-to-high.

## **Viewer Exposure**

Project site visibility is moderate-to-high due to the somewhat elevated perspective of this viewpoint and the generally unobstructed view of the foreground project site available to pedestrians, motorists, and upper-level, east-facing residences. The viewing distance is approximately 0.5 mile. The number of potential viewers is low-to-moderate and the view duration is brief (pedestrians and motorists) to extended (residents). Viewer exposure is moderate.

## **Overall Visual Sensitivity**

From KOP 2, the low-to-moderate visual quality is partially countered by the moderate-to-high viewer concern, which when considered with the moderate viewer exposure, results in a moderate visual sensitivity.

## **KOP 3 – I-280/Third Street Neighborhood**

KOP 3 represents the view to the northeast from the I-280/Third Street residential neighborhood in the vicinity of 25th and Indiana Streets. KOP 3 was established at an upper floor residential structure and evaluates the views that would be available to upper floor residences with views to the project site.

## **Visual Quality**

The view from KOP 3 includes the industrial/commercial portion of the I-280/Third area between I-280 and Third Street to the east (see **VISUAL RESOURCES Figure 9A**). The existing Station A building and Unit 3 stack are prominent features in the foreground urban, industrial landscape. Though partially visible in the background, the Bay and East Bay Hills appear as subordinate features to the more prominent geometric and complex foreground structural elements. Visual quality is moderate, reflecting a balance between a prominent urban industrial landscape and a panoramic background of predominantly natural features.

## **Viewer Concern**

The power plant site would be visible from upper-floor residences with unobstructed views toward the project site. While residents generally anticipate open, frontal views of a highly urbanized, industrial waterfront landscape, any new industrial features that would further detract from, or block views of the Bay or East Bay Hills would be perceived as detracting from the more scenic aspects of these views. Therefore, viewer concern is moderate.

## **Viewer Exposure**

Project site visibility is moderate-to-high for those elevated upper-floor and unobstructed views represented by KOP 3. The foreground viewing distance is approximately 0.4 mile. While the number of such upper-floor viewers is low for these foreground views, the duration of view is extended. Therefore, viewer exposure is moderate.

## **Overall Visual Sensitivity**

The low visual quality, low-to-moderate viewer concern, and moderate viewer exposure all contribute to a low-to-moderate rating for overall visual sensitivity.

## **KOP 4 – Hunters Point Neighborhood**

KOP 4 represents the view to the north from the Hunters Point residential area, which is located south of the project site at a distance of slightly less than 1.5 miles. KOP 4 is located at the top of a staircase near the intersection of Hudson Avenue and Ardath Court. This location provides an elevated perspective of San Francisco's eastern industrial waterfront area.

## **Visual Quality**

The view from KOP 4 to the north encompasses an immediate foreground of residential development, overlooking the industrial areas along San Francisco's eastern waterfront. The waterfront industrial areas are generally east of I-280 and are backdropped by the downtown financial district, Bay Bridge, Yerba Buena Island, and San Francisco Bay. The visible landscape is comprised of a mosaic of forms and colors ranging from the geometric shapes and hard lines of industrial structures and downtown highrises of light coloration to the more naturally appearing, dark green irregular forms of the foreground vegetation and blue, horizontal to irregular expanse of San Francisco Bay (see **VISUAL RESOURCES Figure 10A**). The contrast between the developed and more natural features contribute visual variety and interest to views from this location, though the existing Potrero Power Plant and Hunters Point Power Plant are prominent middleground features in the view. Visual quality is moderate, reflecting a balance of the panoramic vista of the distant city skyline, bridge, and Bay, with the prominence of the middleground urban industrial landscape.

## **Viewer Concern**

The power plant site is visible from numerous residences along the north side of Hunters Point. While residents generally anticipate open, frontal views of a highly urbanized, industrial waterfront landscape, any new industrial features that would further detract from views of the city skyline, Bay Bridge, or Bay would be perceived as detracting from the more scenic elements of these views. Viewer concern at this middleground viewing distance is moderate.

## **Viewer Exposure**

Project site visibility is moderate and reflects a balance between improved visual access resulting from an elevated perspective over the project area, and reduced visual access which results from a more distant middleground viewing location (approximately 1.4-mile viewing distance), partial screening by existing structures, and the solid backdrop provided by existing structures. The number of potential viewers is moderate-to-high

and the potential view duration is brief (pedestrians and motorists) to extended (residents). Viewer exposure is moderate.

### **Overall Visual Sensitivity**

From KOP 4, the moderate visual quality, viewer concern, and viewer exposure all contribute to an overall moderate visual sensitivity.

### **KOP 5 – Bernal Heights Neighborhood**

KOP 5 represents the view to the northeast from the Bernal Heights area in the vicinity of Rutledge and Brewster Streets. Public views are somewhat limited in this area though a number of northeast facing residents have direct, but partially screened (by Potrero Hill and existing structures) views of the project site.

#### ***Visual Quality***

KOP 5 provides a somewhat elevated and panoramic vista over a highly urbanized landscape of residential, industrial, and commercial development. The existing power plant is visible in the middleground and the Unit 3 stack is a prominent vertical element that is backdropped by San Francisco Bay and the East Bay Hills beyond (see **VISUAL RESOURCES Figure 11A**). Visual quality is moderate and reflects a balancing of the scenic qualities associated with the panoramic vista of the greater Bay landscape with the predominance of the foreground to middleground complex urban character which is generally lacking in scenic or otherwise unique visual qualities.

#### ***Viewer Concern***

The power plant site is partially visible from northeast-facing residences and public streets. While residents generally anticipate open views of a highly urbanized, residential and industrial waterfront landscape, any new industrial features that would further detract from, or block views of the Bay or East Bay Hills would be perceived as detracting from the more scenic aspects of these views. Viewer concern is moderate at this middleground viewing distance of approximately 1.4 miles.

#### ***Viewer Exposure***

Project site visibility is somewhat obscured by intervening terrain and existing structures, and is low-to-moderate for those residences with unobstructed, northeast-facing views as represented by KOP 5. While the number of such viewers is moderate for these middleground views, the duration of view is extended. The resulting viewer exposure is moderate.

### **Overall Visual Sensitivity**

The moderate visual quality and viewer concern are somewhat offset by the low-to-moderate viewer exposure and the resulting visual sensitivity is low-to-moderate.

### **KOP 6 – Bayview Neighborhood**

KOP 6 represents the view to the northeast from the residential areas in the Bayview District, located approximately 1 3/4 miles southwest of the project site. This location provides an elevated perspective of San Francisco's eastern industrial waterfront area.



## **Visual Quality**

The view from KOP 6 to the northeast encompasses an immediate-foreground dominated by school facilities and some vegetation overlooking a middleground of industrial development along San Francisco's eastern waterfront. In the background are the East Bay Hills and a small section of San Francisco Bay. The existing Unit 3 stack is a prominent vertical feature in the landscape as is the partially screened (though closer) Hunters Point Power Plant stack (see **VISUAL RESOURCES Figure 12A**). The visible landscape is generally lacking in scenic or otherwise unique landscape features and visual quality is low-to-moderate.

## **Viewer Concern**

The power plant site is visible from numerous residences within the Bayview District. While residents generally anticipate open, frontal views of a highly urbanized, industrial landscape, any new industrial features that would further detract from views of the city skyline, Bay Bridge, or Bay would be perceived as detracting from the more scenic elements of these views. Viewer concern at this middleground viewing distance is moderate.

## **Viewer Exposure**

Project site visibility is moderate and results from improved visual access associated with the slightly elevated perspective and absence of significant screening at this location. This enhanced visual access is partially countered by the middleground viewing distance and solid form backdrop of the East Bay Hills (which would minimize new structure skylining). The number of potential viewers is low-to-moderate while view duration is brief (pedestrians and motorists) to extended (residents). Viewer exposure is low-to-moderate.

## **Overall Visual Sensitivity**

From KOP 6, the low-to-moderate visual quality and viewer exposure combined with the moderate viewer concern cause an overall low-to-moderate visual sensitivity.

## **KOP 7 - Pacific Bell Park**

Pacific Bell Park is a recently completed baseball stadium, which is one of the region's premier sports destinations. The design of the stadium is such that the northern third of the stadium's seats are generally oriented to the south, with unobstructed views toward the proposed project location. KOP 7 represents the view from Section 328/330 of the upper level of Pacific Bell Park.

## **Visual Quality**

The view to the south from KOP 7 is somewhat elevated and provides a panoramic vista view of San Francisco Bay and the foreground waterfront industrial areas located north of the project site and east of Third Street. The vista view is partially framed by the stadium structure and extends to the distant ridgelines of the South Bay Hills. The existing power plant is visible in the middleground and the Unit 3 stack is a prominent vertical element (see **VISUAL RESOURCES Figure 13A**). Visual quality is moderate and reflects a balancing of the greater Bay landscape's scenic qualities with the foreground to middleground complex maritime industrial character.

## **Viewer Concern**

Part of the appeal of the new stadium is the view of the City's waterfront available to various portions of the stadium. While visitors generally anticipate open views of a waterfront maritime industrial landscape, any new industrial features that would impact views of the skyline or Bay would be perceived as detracting from the more scenic elements of these views. However, it is acknowledged that the primary focus of the viewer's attention is the activity occurring on the field. Therefore, viewer concern to landscape changes in the project vicinity is low-to-moderate.

## **Viewer Exposure**

Project site visibility from KOP 7 is low-to-moderate and reflects a balance between the elevated perspective available from the upper stands and the visual draw of the existing Unit 3 stack as a landmark middleground feature which increase project visibility, and the blending of the project features with the surrounding landscape which reduces project visibility. While the middleground viewing distance is approximately 1.6 miles, the number of potential viewers is low-to-moderate and the view duration is extended. The resulting viewer exposure is low-to-moderate.

## **Overall Visual Sensitivity**

The moderate visual quality is somewhat offset by the low-to-moderate viewer concern and viewer exposure. The resulting visual sensitivity is low-to-moderate.

## **KOP 8 – Aqua Vista Park**

KOP 8 represents the view to the south from Aqua Vista Park, located slightly over one-half mile due north of the project site.

## **Visual Quality**

Though open, panoramic, vista views of San Francisco Bay and the East Bay Hills are available when viewing east from KOP 8, the view to the south toward the project site primarily encompasses the foreground shoreline landscape of Central Basin, which is dominated by maritime activities and warehouse structures, docked tanker ships, and a small marina. Much of the shoreline in the immediate area appears to have been degraded by industrial uses and the small marina is in a state of disrepair (see **VISUAL RESOURCES Figure 14A**). Visual quality is rated low-to-moderate.

## **Viewer Concern**

Users of Aqua Vista Park typically focus on the immediate landscape of Central Basin with views also being drawn to the east toward the open waters of San Francisco Bay and the East Bay Hills beyond. Although viewer concern regarding the potential impairment of views of the Bay (to the east) would be high, viewer concern regarding changes in the area south of the park, in the vicinity of the project site, is low-to-moderate.

## **Viewer Exposure**

Project site visibility is low-to-moderate at a foreground viewing distance and reflects the partial screening of the project site by intervening warehouse structures. Although the

number of viewers is low, the duration of view is extended. As a result, viewer exposure is low-to-moderate.

### **Overall Visual Sensitivity**

The low visual quality and low-to-moderate viewer concern and viewer exposure contribute to an overall low-to-moderate rating for visual sensitivity.

## **KOP 9 – San Francisco Bay**

KOP 9 represents the view to the west from San Francisco Bay and is located slightly over one-half mile to the northeast of the project site. This viewpoint captures the shoreline views available to the recreational boaters that ply the Bay waters off the San Francisco eastern waterfront.

### **Visual Quality**

The view to the west from KOP 9 encompasses a panoramic foreground view of San Francisco's eastern industrial waterfront area and nearshore waters of San Francisco Bay. In the background are the rolling landforms of Bernal Heights and Potrero Hill, with Sutro Tower appearing as a noticeable vertical form to the west of the project site. Most prominent in views from KOP 9 are the industrial structures comprising the existing Potrero Power Plant, with the Unit 3 stack the dominant vertical feature in the shoreline landscape (see **VISUAL RESOURCES Figure 15A**). Visual quality is low-to-moderate.

### **Viewer Concern**

From the nearshore Bay immediately to the east of Central Basin, the viewer's attention is typically drawn to the ridgelines of the peninsula to the west, the dramatic skyline of the City's downtown highrises to the north, and the Bay Bridge to the north and northeast. Boaters along this portion of the Bay generally anticipate the industrial features of the eastern waterfront and the Unit 3 stack is a particularly prominent and noticeable feature. Although viewer concern regarding any impairment of views of ridgelines and City skylines would be high, viewer concern with respect to shoreline landscape changes in the immediate project vicinity at Central Basin would be moderate as long as ridgeline views were minimally impaired.

### **Viewer Exposure**

When viewed from KOP 9 and San Francisco Bay, the proposed project partially blends with the surrounding industrial context. The resulting visibility is moderate-to-high at this foreground viewing distance. While the number of viewers is low-to-moderate, the duration of view is extended. The resulting viewer exposure is moderate.

### **Overall Visual Sensitivity**

From KOP 9, the low-to-moderate visual quality and moderate viewer concern and viewer exposure all contribute to an overall moderate rating for visual sensitivity.

## **Other Viewing Areas**

### **South Of Market Highrises**

There are numerous high rise buildings in the South of Market area with east-to-south, unobstructed viewing opportunities toward the proposed project site. However, as shown in **VISUAL RESOURCES Figure 16**, the views from these highrises are panoramic in scope, encompassing the highly urbanized landscape of the South of Market and southeastern waterfront and maritime industrial areas. Within this highly developed urban context, the project site is minimally noticeable at this middleground viewing distance, particularly given the complexity and dominance of foreground structural features.

### **Warm Water Cove Park**

Warm Water Cove Park is located immediately adjacent and to the south of the existing power plant site. The proposed HRSG structures and exhaust stacks would be prominent foreground features in views to the north from this location. The stacks would appear taller than the nearby industrial buildings including the buildings closest to the park that partially block portions of the project site. The HRSG structures would replicate the industrial character already present on the site, which has low visual quality. Although viewer concern would be high for park users, the park is minimally used. Therefore, viewer exposure would be low and overall visual sensitivity would be moderate.

### **National Register Historic District at Pier 70**

The Port of San Francisco Waterfront Land Use Plan calls for adaptive reuse of three Union Iron Works buildings, which are historic and architecturally significant structures at Pier 70, within the potential historic district between 20th and 22nd Streets along Illinois Street. The plan proposes a mixture of maritime and non-maritime land uses in this historic district, providing access to the working waterfront so long as use is compatible with existing ship repair operations. The uses envisaged also include new residential and/or commercial activity.

The district is located approximately 1/3 mile north of the Unit 7 project site. The Union Iron Works Buildings occur two long blocks to the north along Illinois Street, although other currently vacant land within the district appears to extend almost to 22nd Street, within 1/4 mile of the project site. Existing views toward the project site from the historic district are substantially blocked or framed by intervening structures along Illinois Street. Within this industrial context and foreground screening, the project site would be minimally noticeable to occupants, pedestrians, and visitors within the district.

### **Bay Trail**

The proposed Bay Trail in the project vicinity travels north along Third Street until reaching 23rd Street, then turns eastward for one block to Illinois Street, before continuing north along Illinois Street to Aqua Vista Park and Terry A. Francois Boulevard. From all viewpoints along the Bay Trail route in the vicinity of the proposed project, the view would be dominated by foreground maritime industrial and commercial structures adjacent to the route and the existing Unit 3 stack. Traveling north along

Third Street between Hunters Point Boulevard and 23rd Street, the proposed project site would be partially to fully screened from views by intervening structures in the general waterfront industrial area. Traveling east along 23rd Street, users of the Bay Trail would have direct views of the site, which would include the existing power plant facilities. Traveling south on Illinois Street from Aqua Vista Park, views of the site are partially to fully screened by intervening structures along Illinois Street and within the general waterfront industrial area. With the exception of the short segment along 23rd Street, the project site would be minimally noticeable to users of the Bay Trail given the adjacent industrial context and foreground structural screening.

## **IMPACTS**

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### **CONSTRUCTION IMPACTS**

#### **Power Plant**

Construction of the proposed power plant would cause temporary visual impacts due to the presence of equipment, materials, and workforce. Construction would involve the use of cranes, heavy construction equipment, temporary storage and office facilities, and temporary laydown/staging areas. These pieces of equipment and facilities would be stored on and adjacent to the project site in an area already exhibiting industrial visual character. Visual impacts would primarily occur at the proposed power plant site and construction laydown areas over a 12 to 16-month period of time when the construction cranes and large equipment would be on-site. Approximately five cranes would be used and would range in height from under 100 feet to approximately 300 feet. With this range of heights, some visual intrusion on views of the Bay would occur, primarily for those KOPs in close proximity to the site (KOPs 1, 2, and 3). At greater viewing distances, the cranes would appear less prominent and from north and south viewing angles, the cranes would not be backdropped by the Bay or East Bay Hills. To further reduce the potential for adverse visual impacts during construction, the Applicant has indicated a willingness to lower and/or relocate high-profile construction equipment on-site when not in use (SEP 2000Dresp1, Data Response No. 78). Given the relatively short duration of power plant construction and presence of the tall cranes, adverse but not significant visual impacts would occur. However, the adverse visual impact can be lessened with implementation of staff's Mitigation Measure VIS-7 and proposed Condition of Certification VIS-4 described later in this analysis.

Also, the majority of construction activities would occur during daylight hours when supplemental lighting would not be needed. However, if supplemental construction lighting is needed, the lighting would be consistent in terms of color and intensity with lighting from other sources in the area. Furthermore, the Applicant has committed to providing directional and/or shielding devices to minimize visible lighting (SEP 2000Dresp1, Data Response No. 71). Therefore, short-term construction lighting impacts would not be significant. In order to ensure that significant construction lighting impacts do not occur, staff has recommended Condition of Certification VIS-2, presented later in this analysis.

## **Electrical Transmission Interconnection**

Views of the electrical transmission interconnection construction equipment, materials, and activities would be available to commercial, business park, and industrial occupants, and travelers along the roads the interconnection would be following. Transmission line cable construction would be highly visible in the foreground of views to the adjacent uses. However, occupants would have a frontal view of the cable laying equipment for a relatively short period of time. Six 1,550-foot excavations would be carried out in sequence with no more than two trench excavations active at one time. Trenching would be completed within five to six weeks and cable installation and splicing would take an additional four to five weeks. The total job time would be approximately four months (SECAL 2000a, AFC pp. 2-32 & 33). Therefore, the potential exposure for viewers would be relatively short at any location and the visual impacts associated with construction of the underground transmission cable would be adverse but not significant.

## **OPERATION IMPACTS**

The analysis of operation impacts is presented for the view area represented by each Key Observation Point (KOP) in the Visual Analysis Summary table provided in Appendix A. For each view area and KOP, an evaluation of visual contrast, project dominance, and view blockage is provided with a concluding assessment for the severity of visual change. The potential for operations impacts to occur on additional viewing areas is also discussed.

One key visual consideration of the proposed project is the removal of the Station A building. By comparison to Station A, the new HRSG structures would be approximately 180 feet high, 47 feet long, and 105 feet wide (see VISUAL RESOURCES Table 1). The primary visual change that would be noticed from each viewing area and Key Observation Point would be a reduction in structural mass which would be attributable to changes in structural heights and lengths. As shown in Table 1, the new HRSG structures will be substantially taller (180 feet at the top of stack) than the existing Station A building (105 feet). However, while the width of the Station A structure (106 feet) would be similar to the width of the 94-foot tall HRSG train (105 feet), above the HRSG train, the remaining 86 feet of structural height would be only the 16-foot width of the HRSG stacks. Also, while the Station A building is approximately 420 feet long (north to south), the two HRSG structures are only approximately 47 feet in length (north to south) and are spaced approximately 75 feet apart.

**VISUAL RESOURCES Table 1**  
**Comparison of Dimensions for Station A and New HRSG Structures\***

	<b>Station A</b>	<b>New HRSG Structures (x2)</b>
<b>Height</b>	105 feet <sup>1</sup>	180 feet <sup>3</sup> (each stack)
<b>Width (east-west)</b>	106 feet <sup>2</sup>	105 feet <sup>4</sup> for the HRSG Train/Stack (lower 94 feet) 16 feet <sup>4</sup> above the HRSG Train for the Stack only (upper 86 feet)
<b>Length (north – south)</b>	420 feet <sup>2</sup>	47 feet <sup>4</sup> (each HRSG Train)

<sup>1</sup> Source: SECAL 2000a, Figure 8.11-3

<sup>2</sup> Source: SECAL 2000b, Figure 2-2A

<sup>3</sup> Source: SECAL 2001g, Replacement Figure 2-3

<sup>4</sup> Source: SECAL 2000a, Figure 2-3, Dimensions are scaled approximations

The resulting visual change is a substantial reduction in the structural mass on the site that was created by the 420-foot long by 105-foot high Station A building. The visual trade-off is the additional 86 feet of height attributable to the two 16-foot wide stacks. However, the reduction in structural mass will open up additional sight lines through the project site that is currently blocked by the Station A building. The impact discussions presented in the following sections address the net visual changes that would be observed from each viewing area and KOP and take into account both the reduction of structural mass (removal of Station A) and increase in structural height (addition of HRSG structures).

## **Kop 1 – Potrero Hill; Watchman Way Neighborhood**

**VISUAL RESOURCES** Figure 7B presents a photosimulation of the proposed project as viewed from KOP 1 at the cul-de-sac on Watchman Way. The most obvious change to the landscape would be the removal of the massive block form of the Station A complex with its dark coloration and introduction of the taller though less massive vertical forms of the HRSG structures and stacks.

### **Visual Contrast**

The proposed project would remove the prominent horizontal block form of the Station A complex and introduce linear forms of the HRSG structures and stacks with their prominent vertical structural lines (see Table 1). While the introduced forms and lines would be consistent with the forms and lines already established by the Unit 3 facilities, the lighter coloration of the two new stacks would introduce color contrast with the darker blue colors of San Francisco Bay and the East Bay Hills. As presented in the Visual Analysis Summary table (see Appendix A), a moderate degree of visual contrast would be perceived from KOP 1 with implementation of the proposed project.

### **Project Dominance**

The landscape visible from KOP 1 is comprised of a mosaic of land, water, and structural forms, all appearing co-dominant in the viewshed. The complex of foreground commercial buildings, transportation infrastructure, and maritime industrial features all compete with the picturesque backdrop of San Francisco Bay and the East Bay Hills for the viewer's attention. The proposed power plant facilities would be sufficiently prominent that they would appear co-dominant with existing urban features and the panoramic background landscape. The proposed project would appear moderate in size in the wide field of view. However, the height of the vertical HRSG stacks and the removal of Station A, a recognizable historic building which is prominent in these views, would both increase the structural prominence of the HRSG facilities. Project dominance is rated co-dominant.

### **View Blockage**

From KOP 1 the vertical HRSG structures and stacks (lower quality landscape features) would block from view slightly more of San Francisco Bay and the East Bay Hills (higher quality landscape features) than is currently blocked from view by the Station A complex. View blockage would be low-to-moderate.

## **Overall Visual Change**

From KOP 1, the overall visual change caused by the proposed project would be moderately adverse due to the moderate degree of structural contrast that would occur and the project's low-to-moderate degree of view blockage of higher quality landscape features (San Francisco Bay and the East Bay Hills).

## **Visual Impact Significance**

When considered within the context of the moderate-to-high visual sensitivity of the existing landscape and viewing characteristics, the moderately adverse visual change that would be perceived from KOP 1 would cause an adverse but not significant visual impact. This visual impact would have been significant without the removal of the Station A building. However, with removal of Station A, the project site is visually more open to the Bay and new sightlines from Potrero Hill through the site to the Bay are created. Also, the adverse visual impact can be lessened with implementation of the Applicant's proposed Mitigation Measure VIS-6, as augmented by staff's recommended Condition of Certification VIS-1 presented later in this analysis.

## **KOP 2 – Potrero Hill; 20th and Mississippi Streets Neighborhood**

**VISUAL RESOURCES Figure 8B** presents a photosimulation of the proposed project as viewed from KOP 2, near the intersection of 20th Street and Mississippi Street, northwest of the project site. Residents, pedestrians, and motorists in the vicinity would have a foreground view of the proposed project over the rooftops of the I-280/Third Street neighborhood. The complex and linear forms of the power plant structures would be clearly visible to the southeast, with the most apparent changes to the landscape being the removal of the massive block form of the Station A complex and introduction of the taller though less massive vertical forms of the HRSG facilities. The two new stacks would protrude above the Bay water line, silhouetted against the sky and East Bay Hills. The removal of the Station A complex is less apparent in views from this direction, due to distance and screening by other buildings.

## **Visual Contrast**

The proposed project would introduce prominent linear forms with vertical structural lines into the existing waterfront industrial landscape. These forms and lines would be similar to forms and lines already established by the existing power plant and the structural contrast would be low. However, from this viewing angle relative to the positions of the project structures and the sun, the HRSG structures would frequently be viewed in silhouette, appearing darker than the lighter background of Bay, sky, and East Bay Hills (as illustrated in **VISUAL RESOURCES Figure 8B**). During these occurrences, the darker coloration of the two new stacks would introduce color contrast with the lighter blue colors of the Bay, sky, and the East Bay Hills. As a result, a moderate degree of visual contrast would be perceived from KOP 2 with implementation of the proposed project.

## **Project Dominance**

Backdropped by San Francisco Bay and the East Bay Hills, the most prominent landscape feature in the view from KOP 2 is the complex urban development of the foreground I-280/Third Street neighborhood consisting of residential, commercial, and



industrial structures. The proposed power plant facilities would be roughly similar in scale to the existing power plant and adjacent commercial/industrial buildings. The proposed project would appear smaller relative to the residential buildings in the immediate foreground of views from KOP 2, though prominent against the background of Bay and East Bay Hills. In the wide field of view available, the proposed structures would appear small to moderate in size and similar in extent to that of the existing power plant facilities. However, the new HRSG structures would appear more prominent than the existing Station A. Overall, the proposed project would appear co-dominant with the existing power plant and adjacent commercial and industrial buildings.

### **View Blockage**

From Key Observation Point 2 the proposed HRSG structures and stacks (lower quality landscape features) would block from view a slightly larger portion of San Francisco Bay and the East Bay Hills (higher quality landscape features) than is currently blocked from view by the Station A complex. This slight increase in view blockage would not be substantially noticeable and the removal of the Station A complex would open up new sightlines to the Bay from the areas represented by KOP 2. Also, the power plant site is not located in the center of views represented by KOP 2, as was the case for KOP 1. As a result, view blockage would be low.

### **Overall Visual Change**

From KOP 2, the overall visual change caused by the proposed project would be moderately adverse because of the moderate degree of structural visual contrast of the co-dominant project features and low degree of view blockage of higher quality landscape features.

### **Visual Impact Significance**

When considered within the context of the moderate visual sensitivity of the existing landscape, the moderately adverse visual change that would be observed from the area represented by KOP 2 would cause an adverse but not significant visual impact. This impact determination is primarily a result of the moderate degree of visual contrast that would be caused by the new HRSG structures. However, the visual impact can be lessened with implementation of the Applicant's proposed Mitigation Measure 6, as augmented by staff's recommended Condition of Certification VIS-1 presented later in this analysis.

### **KOP 3 – I-280/Third Street Neighborhood**

**VISUAL RESOURCES** Figure 9B presents a photosimulation of the proposed project as viewed from KOP 3 near the intersection of 25th Street and Indiana Street. From this location, the project facilities would appear as prominent foreground features with greater height than the adjacent structures with the exception of the Unit 3 stack. Another noticeable change would be the removal of the prominent horizontal red-brick block form of the Station A complex.

## **Visual Contrast**

The proposed project would introduce prominent linear and geometric forms with vertical and horizontal structural lines similar to those of the existing power plant facilities and structures of the I-280/Third Street Neighborhood. From this vantage point, the HRSG structures and stacks would appear slightly taller than the more massive existing Station A complex, resulting in a moderate degree of visual contrast when compared to the existing power plant structures and lower horizontal profile of the adjacent commercial and industrial buildings. The light colored stacks extending above the horizon line would contribute a low-to-moderate level of color contrast. As a result, the proposed project would cause moderate visual contrast as viewed from KOP 3.

## **Project Dominance**

The landscape visible from KOP 3 is dominated by a mosaic of built commercial and industrial structures, with the background of San Francisco Bay and the East Bay Hills appearing as subordinate though noticeable features. The proposed project would appear moderate in size in the wide field of view. While the new HRSG structures with their taller stacks would be slightly more prominent than the existing Station A, the proposed facilities would appear co-dominant with the existing Unit 3 and the foreground industrial and commercial buildings.

## **View Blockage**

From Key Observation Point 3 the proposed HRSG facilities (lower quality landscape features) would block from view slightly more of the East Bay Hills and sky (higher quality landscape features) than is currently blocked from view by the Station A complex. The new stacks would also extend above the horizon line of the East Bay Hills resulting in a slight degree of “skylining.” There would be a perceptible change in views from KOP 3 and view blockage would be low-to-moderate.

## **Overall Visual Change**

From KOP 3, the overall visual change caused by the proposed project would be moderately adverse, primarily due to the moderate degree of structural contrast that would occur.

## **Visual Impact Significance**

When considered within the context of the low-to-moderate overall visual sensitivity of the existing landscape and viewing characteristics, the moderately adverse visual change that would be observed from the area represented by KOP 3 would cause an adverse but not significant visual impact. This conclusion is primarily the result of increased contrast and view blockage that would occur relative to that presently caused by Station A. However, the visual impact can be lessened with implementation of the Applicant’s proposed Mitigation Measure VIS-6, as augmented by staff’s recommended Condition of Certification VIS-1 presented later in this analysis.

## **KOP 5 – Bernal Heights Neighborhood**

**VISUAL RESOURCES Figure 11B** presents a photosimulation of the proposed project as viewed from KOP 5 in the vicinity of Rutledge and Brewster Streets in the Bernal Heights area. From this vantagepoint, the project’s two new stacks would be slightly

noticeable against a backdrop of San Francisco Bay and the East Bay Hills. Residents and pedestrians in the vicinity would have an elevated, but partially screened middleground view of the proposed project over foreground residential development and the commercial and maritime industrial uses of San Francisco's southeastern waterfront.

### **Visual Contrast**

The proposed project would introduce linear forms with vertical structural lines into the view from KOP 5. The introduced forms, lines, colors, and surface textures would be similar to the structural characteristics already present in the landscape (adjacent Unit 3 power plant and commercial and industrial buildings) though more noticeable than those of the existing Station A due to the highlighting effect caused by the backdrop of the Bay and East Bay Hills. The resulting visual contrast would be low-to-moderate when viewed from the Bernal Heights area represented by KOP 5.

### **Project Dominance**

The most prominent landscape features visible from KOP 5 are the foreground trees and residential buildings. Against a highlighting backdrop of water, and East Bay Hills, the existing Unit 3 stack is a prominent middleground feature. The new HRSG structures would appear slightly smaller in scale than the existing Unit 3 facilities but more prominent than the existing Station A. In the field of view available from this area, the proposed structures would appear small in size in comparison to the foreground trees and residential buildings. Overall, the proposed project would be perceived as a subordinate landscape element.

### **View Blockage**

From Key Observation Point 5 the proposed HRSG structures (lower quality landscape features) would block from view a slightly larger portion of San Francisco Bay and the East Bay Hills (higher quality landscape features) than is currently blocked from view by Station A. At this middleground viewing distance and wide field of view, the resulting view blockage would be low.

### **Overall Visual Change**

As viewed from KOP 5, the overall visual change resulting from the proposed project would be slightly adverse, primarily due to the introduction of additional structures into the view with resulting low-to-moderate degree of visual contrast.

### **Visual Impact Significance**

Within the context of a landscape with low-to-moderate visual sensitivity and viewing characteristics, the slightly adverse visual change that would be observed from the area represented by KOP 5 would cause an adverse but not significant visual impact.

## **KOP 6 – Bayview Neighborhood**

**VISUAL RESOURCES** Figure 12B presents a photosimulation of the proposed project as viewed from KOP 6 in the Silver Avenue / Thomas Avenue neighborhood. From this vantagepoint, residents and pedestrians in the vicinity would have an elevated, distant middleground view of the proposed project. The most notable change in the landscape

would be the removal of the Station A complex with its contrasting red-brick color and the introduction of two additional stacks of smaller scale compared to the existing Unit 3 stack.

### **Visual Contrast**

The proposed project would replace the horizontal geometric block structure of Station A with two linear structures with vertical lines. The new structures would appear similar to the existing Unit 3 facilities and other industrial facilities visible in the wide field of view. While the light gray color of the proposed facilities would help to blend the structures with the surrounding development, the vertical forms of the HRSG stacks would be slightly more noticeable than the red-brick form of the existing Station A due to the highlight effect caused by the distant backdrop of the East Bay Hills. The resulting visual contrast would be low-to-moderate.

### **Project Dominance**

The most prominent landscape elements visible from KOP 6 are the foreground school buildings and the adjacent trees. These features are backdropped by the middleground commercial and industrial areas along San Francisco's southeastern waterfront area from Central Basin to Hunters Point and India Basin. The distant horizon is defined by the ridgeline of the East Bay Hills. In the field of view available, the proposed structures would appear relatively small in size in comparison to the foreground school buildings and trees and residential buildings. However, the proposed project would appear slightly more prominent than the existing Station A and co-dominant with other prominent middleground features including the existing Unit 3 facilities and the Hunters Point power plant. Overall, the proposed project would be perceived as a subordinate-to-co-dominant landscape element.

### **View Blockage**

From Key Observation Point 6 the proposed HRSG structures (lower quality landscape features) would block from view slightly more of the East Bay Hills (higher quality landscape features) than is currently blocked from view by Station A. However, the perceptible change in the landscape as viewed from KOP 6 would be low, as would the resulting view blockage.

### **Overall Visual Change**

From KOP 6, the overall visual change resulting from the proposed project would be moderately adverse, due to the low-to-moderate degree of visual contrast and subordinate-to-co-dominant presence of the HRSG stacks.

### **Visual Impact Significance**

Within the context of a landscape that has a low-to-moderate visual sensitivity, the moderately adverse visual change that would occur when viewed from the Bayview area represented by KOP 6, would cause an adverse but not significant visual impact. This conclusion is primarily the result of the increased contrast, prominence, and view blockage caused by the proposed HRSG structures relative to that caused by the existing Station A.

## **KOP 7 – Pacific Bell Park**

**VISUAL RESOURCES** Figure 13B presents a photosimulation of the proposed project as viewed from KOP 7 from Section 328/330 of Pacific Bell Park. From this vantagepoint, spectators would have an elevated, middleground view of the proposed project. The existing Unit 3 stack is the most prominent feature extending above the horizon. The most notable change in the landscape would be the introduction of the two HRSG stacks behind the fuel storage tank to the right (west) of the existing Unit 3 stack.

### **Visual Contrast**

The proposed project's linear forms and vertical lines would be similar to those of the existing Unit 3 facilities and nearby industrial structures. Although the new stacks would be more visible than the existing Station A, they would still be minimally noticeable in the wide field of view and would appear consistent with adjacent structures in terms of form and color. The resulting visual contrast would be low.

### **Project Dominance**

The most prominent landscape elements visible from KOP 7 are the ballpark's spectator stands and light structures in the immediate-foreground and the expansive parking lot and piers immediately to the south of the park. Also prominent is the expanse of San Francisco Bay. Less prominent but still noticeable in the middleground of views from KOP 7 is the maritime industrial and commercial area to the south, which is backdropped by Hunters Point. The new facilities would be more noticeable than they otherwise might be because of the landmark created by the Unit 3 stack extending prominently above the horizon line. Although the proposed project structures are more prominent than the existing Station A, they are shorter than the existing Unit 3 stack. The new HRSG structures would appear relatively small in scale compared to the foreground features visible from KOP 7 including the ballpark stands and light structures, and the adjacent parking lot, piers, and ships. Overall, the proposed project would be a subordinate landscape feature when viewed from Pacific Bell Park.

### **View Blockage**

From Key Observation Point 7, the proposed project would cause a slight view blockage of residential and commercial structures to the south of the project site, in the Hunters Point area. This view blockage would be greater than that apparent for the existing Station A. Although the proposed stacks would extend slightly above the ridgeline of Hunters Point into an area backdropped by the more distant hills in the South Bay, the proposed project (lower quality landscape feature) would not substantially impair views to any higher quality landscape features. Therefore, view blockage would be low.

### **Overall Visual Change**

As viewed from KOP 7, the overall visual change resulting from the proposed project would be slightly adverse as a result of the low visual contrast and slightly increased view blockage that would occur.

## **Visual Impact Significance**

Within the context of a landscape that has a low-to-moderate visual sensitivity, the slightly adverse visual change that would occur when observed from Pacific Bell Park would cause an adverse but not significant visual impact.

### **KOP 8 – Aqua Vista Park**

**VISUAL RESOURCES** Figure 14B presents a photosimulation of the proposed project as viewed from KOP 8 at Aqua Vista Park, north of the project site. From this location, park users would have a direct foreground view of the proposed project. The most notable change in the landscape would be the introduction of the upper portions of the new HRSG stacks to the right (west) of the existing Unit 3 stack. Although the lower portion of the project structures would be screened from view by intervening buildings, the upper one-third of the HRSG stacks would be visible above the low, horizontal warehouse/industrial building located along the south side of central basin as shown in the center of the photosimulation.

## **Visual Contrast**

The proposed project would introduce linear forms with vertical structural lines. The introduced forms and lines would be similar to forms and lines already present in the landscape (adjacent industrial facilities, stacks, cranes, pilings, and masts) though the height of the stacks and their light coloration would contrast with the background of blue sky. The existing Station A is not visible from this KOP. The resulting visual contrast would be low.

## **Project Dominance**

The landscape visible from KOP 8 is dominated by the maritime and shoreline features of Central Basin consisting of container ships, small pleasure craft, onshore support facilities, a marina, and warehouses. The existing Unit 3 stack to the immediate south also competes for the viewer's attention. The proposed HRSG stacks would extend slightly above the intervening warehouses. Although the stacks would appear relatively small in this confined field of view, the prominence caused by the stacks' skylining would slightly increase project dominance to a level that would be subordinate-to-co-dominant with the adjacent structures and facilities.

## **View Blockage**

From Key Observation Point 8, the proposed HRSG stacks (lower quality landscape features) would extend slightly above the existing horizon line created by the roof line of the existing warehouses. The stacks would block from view a small portion of the sky (a higher quality landscape feature). This slight change in the view from KOP 8 would cause a low degree of view blockage.

## **Overall Visual Change**

From KOP 8, the overall visual change that would result from the proposed project would be slightly adverse due to the low degrees of visual contrast and view blockage that would be caused by the upper portion of the HRSG stacks.

## **Visual Impact Significance**

When considered within the context of the low-to-moderate overall visual sensitivity of the existing landscape and viewing characteristics, the slightly adverse visual change that would be observed from Aqua Vista Park would cause an adverse but not significant visual impact.

## **KOP 9 – San Francisco Bay**

**VISUAL RESOURCES** Figure 15B presents a photosimulation of the proposed project as viewed from KOP 9 on San Francisco Bay, approximately one-half mile northeast of the project site. From this location, boaters on the Bay would have an unobstructed, direct, foreground view of the proposed project. The most notable change in the landscape would be the introduction of the new HRSG stacks and the water intake/discharge structure.

## **Visual Contrast**

The proposed project would introduce prominent linear and geometric block forms with horizontal to vertical structural lines into the existing industrial setting. The introduced forms and lines would be similar to forms and lines already present in the landscape (adjacent power plant and commercial and industrial buildings). Though the greater vertical height of the HRSG stacks would contrast with the lower horizontal profile of the nearby commercial and industrial buildings, they would appear consistent with the existing Unit 3 stack. While the low horizontal form and lines of the water intake/discharge structure would appear consistent with nearby commercial and industrial structures, it would also contrast with the vertical form and lines of the existing and proposed stacks. The visual contrast that would be perceived from KOP 9 would be moderate.

## **Project Dominance**

The foreground landscape visible from KOP 9 is dominated by the broad open expanse of San Francisco Bay. However, the middleground to background landscape is dominated by the Unit 3 stack and the maritime, industrial, and commercial facilities along Central Basin. Also noticeable in the background are Bernal Heights to the southwest, and Potrero Hill and Sutro Tower to the west. With the exception of the existing power plant structures, the proposed power plant facilities would appear dominant over most other shoreline facilities. In addition to appearing moderate in size in the wide field of view, the proposed facilities would appear co-dominant with the existing power plant and Unit 3 stack, as well as the background forms of Potrero Hill and Bernal Heights.

## **View Blockage**

From Key Observation Point 9 the proposed HRSG structures and stacks (lower quality landscape features) would block from view a portion of Potrero Hill that is developed with high-density residential structures. The two new stacks would also extend slightly above the ridgeline of Potrero Hill. This slight increase in view impairment would not substantially degrade the view from KOP 9 specifically, or San Francisco Bay in general and view blockage would be low.

## **Overall Visual Change**

The overall visual change caused by the proposed project would be moderately adverse primarily due to the moderate degree of visual contrast and co-dominance of the proposed HRSG structures that would be observed from KOP 9 and San Francisco Bay.

## **Visual Impact Significance**

When considered within the context of the moderate visual sensitivity of the existing landscape, the moderately adverse visual change that would be observed from the area represented by KOP 9 would cause an adverse but not significant visual impact.

## **Other Viewing Areas**

### **South of Market Highrises**

The proposed project would introduce into the South of Market highrise views additional, though subordinate, linear forms and vertical lines associated with the new HRSG stacks. Because these features would be minimally noticeable, the resulting change in views from this area would be neutral and the project would not cause significant visual impacts.

### **Warm Water Cove Park**

The new HRSG structures would introduce prominent linear, complex forms with strong vertical lines into the foreground views from Warm Water Cove Park. The resulting moderate degree of visual contrast and view blockage that would result from these co-dominant structures would cause an adverse but not significant visual impact when viewed in the context of the existing industrial character of the proposed project site. Implementation of Applicant proposed Mitigation Measure VIS-4, as augmented by staff's recommended Condition of Certification VIS-3, would reduce the visual impact at Warm Water Cove Park.

### **National Register Historic District at Pier 70**

The proposed project would cause a slight increase in structural visual contrast and blockage of sky when viewed from the Historic District. The proposed HRSG structures would also appear subordinate-to-co-dominant in relationship to on-site and intervening foreground structures. However, within the context of existing industrial development both on-site and between the project site and the historic district, the adverse visual change would not cause a significant visual impact.

### **Bay Trail**

The proposed project would cause a moderate increase in structural visual contrast and blockage of sky when viewed from specific viewpoints along the Bay Trail. However, within the context of existing industrial development both on the project site and adjacent to the Bay Trail, the adverse visual change attributable to the proposed project would cause an adverse but not significant visual impact. Additionally, implementation of Applicant proposed Mitigation Measure VIS-5, as augmented by staff's recommended Condition of Certification VIS-3, would further lessen the resulting visual impact.



## **Linear Facilities**

The electrical transmission interconnection would be located underground for the most part within existing roads or rights-of-way. There would be no apparent evidence of the pipeline's presence and long-term project visibility would be limited to an occasional aboveground warning marker. Therefore, long-term visual impacts due to the operation of the linear facilities would be less than significant.

## **Lighting**

Existing visible night lighting in the project vicinity is substantial, ranging from softer amber colored light to intense white light (see **VISUAL RESOURCES Figure 17A**). Sources of light include adjacent commercial buildings, industrial facilities (including the existing Potrero Power Plant), shipyards, and the American Industrial Center; automobile lights and streetlights on nearby roads; and residences. Many of the lights are unshielded or occur in clusters, creating a more prominent visual source of light (SEP2000Dres1, Data Response No. 68). Vehicle head lights and tail lights on Interstate 280 are a prominent source of light in the area and appear as horizontal, bright, solid orange and red bands across the lower portion of the time-lapse photograph.

The proposed project would require nighttime lighting for operational safety and security and would increase the amount of lighting associated with the existing Potrero Power Plant site. There would be additional visible lighting associated with the project stacks, switchyard, and open site areas. Each of the KOPs evaluated in this analysis has a view of the project site during the night when the project lights would be visible. The intensity and noticeability of the lights would be closely correlated with the distance from the site. The closer the KOP to the project site, the more prominent and noticeable the project lighting and adjacent off-site lighting would be. The flashing red lights on the existing Unit 3 stack are presently the most noticeable lighting features at the site due to their height above all other sources of adjacent and nearby lighting. Area lights within the switchyard and around access paths produce an amber color and are less visible because they are less concentrated. Additionally, light emanating from adjacent structures and facilities contributes to the visibility of the plant site (SEP2000Dres1, Data Response No. 69).

Project night lighting would be most visible from those KOPs closest to the project site due to the larger proportion of the nighttime landscape occupied by the project site and its associated lighting. As a result, night lighting would be most visible to KOP 1 (Potrero Hill Neighborhood – Watchman Way), KOP 2 (Potrero Hill Neighborhood – 20th and Mississippi Streets), and KOP 3 (I-280 / Third Street Neighborhood). However, when viewed from KOPs 2 and 3, the proposed lighting would be partially screened by adjacent buildings. Project night lighting would be considerably less noticeable from KOP 4 (Hunters Point Neighborhood), KOP 5 (Bernal Heights Neighborhood), KOP 6 (Bayview Neighborhood), and KOP 7 (Pacific Bell Park) due to the greater viewing distance, wider field of view and greater number of light sources. From Pacific Bell Park, nighttime noticeability of project site lighting would be minimal because the stadium lights would overwhelm all other sources of light. Although KOP 8 (Aqua Vista Park) is located in close proximity to the project site, the lower two-thirds of the project would be screened from view by intervening warehouse facilities. The most

visible of the project light sources would be the flashing red lights on the proposed stacks. Project night lighting would also be very visible to KOP 9 (San Francisco Bay). However, there would be few nighttime viewers on this part of the Bay and the project lighting would be viewed within the context of substantial shoreline commercial and industrial lighting and a backdrop of residential and commercial lighting in the vicinity of Potrero Hill.

In general, the proposed project night lighting would be most visible from KOP 1, which represents the residential neighborhood in the vicinity of Watchman Way. This view area would have elevated and unobstructed views of the project night lighting. **VISUAL RESOURCES Figure 17B** presents a photosimulation of the proposed project with night lighting. As can be seen from the photosimulation, the additional project lighting would be consistent in appearance and intensity with that of existing lighting on and adjacent to the site. The most noticeable additions would be the flashing red warning lights on the two new stacks. Although additional lights would be added to the nighttime landscape, the existing lights on the Station A complex would be eliminated from view with removal of Station A. Overall, the addition of proposed project lighting is not expected to substantially change ambient lighting conditions as viewed from KOP 1 or other viewpoints. The resulting visual impact from project night lighting would be adverse but not significant. However, in order to reduce the offsite adverse impacts from project night lighting, the Applicant has stated the following:

“SECAL commits to providing lighting that does not exceed the intensity of (and would be similar in appearance to) the existing levels at the plant site. Lighting would be consistent with the prevailing amber color currently used, and would be limited to the lower building elevations. All new permanent lights would be shielded to prevent upward lighting, and wherever necessary to eliminate offsite glare, and minimize offsite light spillage. Temporary lighting, using switches and/or motion detectors, would be used wherever possible for maintenance and security purposes. The lighting levels for this project would be kept to the minimum required for safety and maintenance of the plant during operation (SEP2000Dres1, Data Responses Nos. 70, 88, and 89).”

Although, the Federal Aviation Administration (FAA) has determined that the proposed project would not require marking or lighting for aviation safety (SEP2001Dresp4, Data Response No. 173), the Applicant has decided to retain the flashing, red warning lights on the stacks as an option to exercise at their discretion. This option could result in the introduction of unnecessary visual distraction into the nighttime views of the project site, Bay, and East Bay Hills beyond.

Therefore, because of this potential for the project to cause adverse nighttime lighting impacts, staff has expanded upon the Applicant’s general commitment to the above quoted design measures with Condition of Certification VIS-2 (see below). Proper implementation of these measures would minimize lighting and keep lighting impacts to less than significant levels.

### **Visible HRSG Exhaust Plumes**

The proposed project would involve the addition of two new combined-cycle gas turbine/HRSG trains, each of which would be served by a separate stack (referred to in this discussion as HRSG stacks). An analysis of potentially visible plumes from the

HRSG stacks was conducted by the Applicant using the Combustion Stack Visible Plume (CSVP) model. Staff reviewed that analysis and conducted an independent modeling analysis for comparison. The results of staff's analysis are presented here.

### HRSG Parameters

The Applicant modeled one HRSG exhaust condition for the entire year and stated in the response to Data Request #47 (SEP 2000Dresp1) that this represents a conservative condition that will likely overestimate plume occurrence. The AFC did not provide enough data to confirm the Applicant's contention that the conditions modeled were in fact conservative under all cold weather operating conditions. However, after a review of other similar projects, staff determined that the values are reasonable. Therefore the exhaust parameters modeled (see VISUAL RESOURCES Table 2) should provide reasonable plume frequency results.

**VISUAL RESOURCES Table 2**  
**HRSG Exhaust Parameters Provided by the Applicant**

Parameter	HRSG Exhaust Parameters
Stack Height	54.88 meters
Stack Diameter	5.11 meters
Exhaust Temperature	361°K
Exit Velocity (calculated)	22.44 m/s
Exhaust mass flow rate	3,470,000 lbs./hr
Moisture Content (% by weight)	5.90%

### Meteorological Data Summary

The Applicant provided one year (1992) of meteorological data from San Francisco Airport (SFO). SFO was the closest location with meteorological data that included weather and visibility data. The data set provided by the Applicant to staff indicated daylight hours, fog hours, hours with visibility less than one mile, and hours with visibility less than three miles.

### Applicant HRSG Plume Analysis Summary

The Applicant modeled the HRSG stack conditions provided above with the CSVP model as explained in Data Request Response #47. VISUAL RESOURCES Table 3 presents a summary of the Applicant's results and a comparison with the CEC modeled results using the CSVP model.

**VISUAL RESOURCES Table 3**  
**Predicted HRSG Steam Plume Frequency Summary**

	Applicant Results		CEC Results	
	Hours	Frequency	Hours	Frequency
All Hours	1,159	13.19%	462	5.26%
Daytime	366	8.21%	146	3.27%
Night	793	18.34%	316	7.31%
No Fog <sup>a</sup>	905	10.71%	281	3.33%
No Fog Day <sup>a</sup>	255	5.95%	75	1.75%
No Fog Night <sup>a</sup>	650	15.59%	206	4.94%

<sup>a</sup> - Staff Results are no fog and no rain hours.

The Applicant did not provide frequency percentage results by season. However, it is likely that the winter condition daytime no fog condition plume frequencies using the Applicant's frequency data would be shown to be greater than 10%. Staff's analysis shows a considerably lower plume frequency than the Applicant's analysis. It is possible that the Applicant may have used an incorrect moisture content unit as input to the CSVP model.

The Applicant provided plume size characteristics based on 10% occurrence. Therefore, no data was provided for daytime and daytime no fog hours and no useful comparisons with staff's modeled data can be made. However, staff calculated the additional plume dimensions using the Applicant's meteorological data. The results are presented in VISUAL RESOURCES

**Table 4. VISUAL RESOURCES Table 4**  
**Staff Predicted HRSG Steam Plume Dimensions (meters) Using the**  
**Applicant's Meteorological Data**  
**(SFO 1992 MET DATA)**

<b>All Hours</b>	<b>Length</b>	<b>Height</b>	<b>Width</b>
Maximum	771	390	44
Average	262	167	27
Median	205	162	26
<b>Daylight Hours</b>			
Maximum	762	263	43
Average	238	160	26
Median	193	159	26
<b>Daylight No Fog No Rain Hours</b>			
Maximum	762	254	43
Average	246	159	26
Median	195	157	26

The average and median values reflect the average and median dimensions when plumes occur.

### **Staff CSVP Modeling Assessment**

Staff first reviewed the conditions that the Applicant used for modeling the HRSG exhaust. The 1992 SFO meteorological data set provided by the Applicant was used to model the HRSG plume potential using the CSVP model. The modeling results using that data set are provided above in Table 3. Subsequently, staff obtained a six-year (1990 to 1995) meteorological data set for SFO from the National Climatic Data Center (NCDC), which was formatted for use with CSVP. Staff believes that this multi-year data set provides more representative results. Using this data set a total of 3,803 hours were predicted for all 52,583 hours in the six years modeled. Of these 3,803 hours, 662 occurred during daylight and the other 3,141 occurred during nighttime hours. A summary of the predicted visible plume frequency is presented in VISUAL RESOURCES Table 5.

**VISUAL RESOURCES Table 5**  
**Staff Predicted HRSG Steam Plume Frequency Summary**

Season	1990		1991		1992		1993		1994		1995		Totals	
All Hours	Hrs	Freq.	Hrs	Freq.	Hrs	Freq.	Hrs	Freq.	Hrs	Freq.	Hrs	Freq.	Hrs	Freq.
Fall	143	6.5%	108	4.9%	94	4.3%	102	4.7%	316	14.5%	97	4.4%	860	6.6%
Spring	38	1.7%	26	1.2%	1	0.0%	1	0.0%	76	3.4%	119	5.4%	261	2.0%
Summer	0	0.0%	7	0.3%	8	0.4%	0	0.0%	0	0.0%	29	1.3%	44	0.3%
Winter	521	24.1%	323	15.0%	431	19.7%	416	19.3%	537	24.9%	410	19.0%	2,638	20.3%
Total	702	8.0%	464	5.3%	534	6.1%	519	5.9%	929	10.6%	655	7.5%	3,803	7.2%
<b>Daylight</b>														
Fall	23	2.4%	11	1.13%	10	1.0%	12	1.2%	43	4.42%	13	1.3%	112	1.9%
Spring	6	0.5%	7	0.55%	0	0.0%	0	0.0%	7	0.55%	19	1.5%	39	0.5%
Summer	0	0.0%	0	0.00%	2	0.2%	0	0.0%	0	0.00%	5	0.4%	7	0.1%
Winter	97	10.1%	67	6.96%	84	8.6%	75	7.8%	104	10.80%	77	8.0%	504	8.7%
Total	126	2.8%	85	1.90%	96	2.1%	87	1.9%	154	3.44%	114	2.5%	662	2.5%
<b>Daylight No Fog No Rain</b>														
Fall	10	1.1%	3	0.33%	9	0.98%	9	1.0%	16	1.83%	3	0.35%	50	0.93%
Spring	5	0.4%	5	0.41%	0	0.00%	0	0.0%	6	0.49%	12	1.03%	28	0.39%
Summer	0	0.0%	0	0.00%	2	0.16%	0	0.0%	0	0.00%	3	0.24%	5	0.07%
Winter	70	8.4%	20	2.66%	34	4.30%	34	4.3%	38	4.85%	34	4.91%	230	4.95%
Total	85	2.0%	28	0.69%	45	1.07%	43	1.0%	60	1.45%	52	1.31%	313	1.27%

The frequencies predicted by staff using the CSVP model are less than those predicted by the Applicant and they are similar to those predicted by staff using the Applicant's 1992 meteorological data set. The results presented in VISUAL RESOURCES Table 5 show seasonal variability regarding plume potential. However, plumes are predicted to occur less than 9% of the time for all seasons during daylight no fog no rain hours.

Cool ambient temperatures with high relative humidities characterize the ambient conditions that occur during predicted plume events. The range of ambient conditions where HRSG plumes are predicted are presented in VISUAL RESOURCES Table 6 and the CSVP predicted plume size dimensions are provided in VISUAL RESOURCES Table 7.

**VISUAL RESOURCES Table 6**  
**Ambient Conditions During Hours with Predicted HRSG Plumes**  
**SFO Meteorological Data 1990 - 1995**

All Hours	Temperature	Relative Humidity
Maximum	54°F	100%
Minimum	27°F	32%
Average	45°F	92%
Median	45°F	93%

**VISUAL RESOURCES Table 7**  
**Staff Predicted HRSG Steam Plume Dimensions (meters)**

All Hours	Length	Height	Width
Maximum	1339	636	70
Average	390	165	28
Median	290	165	25
<b>Daylight Hours</b>			
Maximum	423	636	58
Average	174	184	26
Median	167	143	24
<b>Daylight Hours No Fog No Rain</b>			
Maximum	392	603	56
Average	175	189	27
Median	172	160	25

The average and median values reflect the average and median dimensions when plumes occur.

## Conclusions

Visible plumes from the HRSG exhaust stacks would occur from the proposed project during periods of cold weather or cool wet weather. The actual frequency of occurrence would vary from year to year. HRSG plume formation can occur during the daytime or nighttime. However, based on the modeling results, the conditions necessary for plume formation are most prevalent during nighttime hours. For all daylight hours predicted to have plumes, 83% were predicted to occur before 10 AM. Under no fog no rain daylight hour conditions, 93% were predicted to occur before 10 AM. The results of the staff CSVP modeling analysis show less frequent plumes than the Applicant. This difference may be due in part to the units of moisture content used in the model.

The average frequency of plumes predicted to occur during daytime under all viewing conditions is less than 9%. For two years (1990 and 1994) the frequency of plume formation during winter slightly exceeded 10%. However, during periods of high visibility, defined as daylight no fog no rain hours, the predicted frequency of plume occurrence is less than 5% for each season in the six years of meteorological data modeled with the exception of the 1990 winter season when plume frequency was 8.4%. Given the relatively low frequency of plume formation (less than 5%) under conditions when the plumes would be most visible, plume formation would not cause significant visual impacts.

## CONSIDERATION OF IMPACTS IN RELATION TO CEQA SIGNIFICANCE CRITERIA

This analysis considered the potential impacts of the proposed project in relation to the four significance criteria for visual resource impacts listed in Appendix G of the CEQA Guidelines, under Aesthetics, specified below.

1. Would the project have a substantial adverse effect on a scenic vista?

Panoramic vistas are available to nearby residents and motorists on project vicinity roads. Views from these areas as well as the Potrero Hill area, which is considered a vista point, would be only slightly affected as the additional visual contrast, and view

blockage caused by the new facilities would be partially offset by the removal of the existing Station A complex. The proposed project would not have a substantial effect on any scenic vista and would not cause significant visual impacts in regard to this criterion.

2. Would the project substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?

The proposed project site is located within the viewshed of two road segments I-280 and I-80 (Bay Bridge), that have been designated as eligible for state Scenic Highway status. As part of the proposed project, the historic Station A complex would be removed. However, the project site would not be prominent in views from these eligible roadways and Station A must be removed for safety reasons. Also, the removal of Station A will open up views through the site, adding new sightlines from Potrero Hill to the Bay. Therefore, the project would not cause significant visual impacts in regard to this criterion.

3. Would the project substantially degrade the existing visual character or quality of the site and its surroundings?

As discussed in a previous section of this analysis, the proposed project would introduce prominent structures of industrial character into the foreground to middleground of views from nearby residential areas, parks, and recreation areas. Residents and recreationists are considered highly sensitive to landscape change. While the proposed project would not significantly impact the existing visual character or quality when viewed from these sensitive areas, the project would adversely effect the existing view to the north from Warm Water Cove Park, immediately adjacent and to the south of the project site. However, implementation of the Applicant proposed Mitigation Measure VIS-4, as expanded by staff's recommended Condition of Certification VIS-3 (see below), would lessen the adverse visual impact.

4. Would the project create a new source of substantial light or glare that would adversely affect daytime or nighttime views in the area?

The project has the potential to create a new source of substantial light that would adversely affect nighttime views in the area. However, the exterior lighting control measures proposed by the Applicant and expanded by staff (see below) would ensure that lighting impacts would be less than significant.

## **CUMULATIVE IMPACTS**

Cumulative impacts to visual resources could occur where project facilities or activities (such as construction) occupy the same field of view as other built facilities or impacted landscapes. It is also possible that a cumulative impact could occur if a viewer's perception is that the general visual quality of an area is diminished by the proliferation of visible structures (or construction effects such as disturbed vegetation), even if the new structures are not within the same field of view as the existing structures. The significance of the cumulative impact would depend on the degree to which (1) the

viewshed is altered; (2) visual access to scenic resources is impaired; (3) visual quality is diminished; or (4) the project's visual contrast is increased.

Potential development within the project vicinity includes the redevelopment of over 600 acres in Mission Bay. This redevelopment would include commercial, residential, and industrial uses north of the proposed project site. Ground-level or lower level viewpoints close to either the proposed project or the Mission Bay redevelopment area would not likely have both projects in the same view due to screening by intervening structures. From more distant viewing opportunities, the two projects would be substantially less noticeable, becoming absorbed in the structural mosaic comprising the panoramic urban landscape. Therefore, any noticeable cumulative impact between these two projects would be adverse but not significant.

Also, the San Francisco Redevelopment Agency is currently preparing, with input from the community, a conceptual plan for Bayview Hunters Point, which encompasses approximately 2,400 acres but excludes the India Basin Industrial Park. To date, no specific plan has been approved. Viewpoints that would encompass both projects would necessarily be a substantial distance from one or both of the projects. These more distant viewing opportunities of one or both of the projects present a similar viewing circumstance as that describe previously for the Mission Bay project. One or both of the projects would be substantially less noticeable in the panoramic urban landscape and any resulting cumulative impact would be at most, adverse but not significant.

## **FACILITY CLOSURE**

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There are at least three circumstances in which a facility closure can take place, planned closure, unexpected temporary closure and unexpected permanent closure.

Planned closure occurs at the end of a project's life, when the facility is closed in an anticipated, orderly manner, at the end of its useful economic or mechanical life, or due to gradual obsolescence. The closure plan that the project owner is required to prepare should address removal of the power plant structures.

Unexpected temporary closure occurs when the facility is closed suddenly and/or unexpectedly, on a short-term basis, due to unforeseen circumstances such as a natural disaster, or an emergency. No special conditions regarding visual resources are expected to be required to address temporary closure.

Unexpected permanent closure occurs if the project owner closes the facility suddenly and/or unexpectedly, on a permanent basis. This includes unexpected closure where the owner remains accountable for implementing the on-site contingency plan. It can also include unexpected closure where the project owner is unable to implement the contingency plan, and the project is essentially abandoned. The contingency plan that the project owner is required to prepare should address removal of the power plant structures.



## COMPLIANCE WITH LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

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### STATE

VISUAL RESOURCES Table 8 provides a preliminary listing of the applicable LORS of the Bay Conservation and Development Commission and the California State Department of Transportation (Caltrans). Relevant policies pertain to the enhancement and/or maintenance of visual quality and the protection of views. The proposed project has been found to be consistent with all eight of the state policies and programs referenced in VISUAL RESOURCES Table 8.

### LOCAL

VISUAL RESOURCES Table 8 also provides a preliminary listing of the applicable LORS of the City and County of San Francisco. Relevant policies pertain to the enhancement and/or maintenance of visual quality, preservation of historic and waterfront character, consistency of architectural design, and the protection of views. The proposed project has been found to be consistent with twenty-four of the local policies referenced in VISUAL RESOURCES Table 8. In two additional cases, the project was found to be partially consistent with local LORS, and in one case the project was found to be inconsistent with to other local LORS. In all cases, following implementation of the Applicant and staff proposed mitigation measures, the proposed project would be fully consistent with all local LORS.

**VISUAL RESOURCES Table 8**  
**Proposed Project's Consistency with**  
**State and Local LORS Applicable to Visual Resources**

LORS		Consistency Determination Before Mitigation	Basis for Consistency
Policy No.	Policy Description		
BAY CONSERVATION AND DEVELOPMENT COMMISSION (BCDC) SAN FRANCISCO BAY PLAN			
Policy 1	To enhance the visual quality of development around the Bay and to take maximum advantage of the attractive setting it provides, the shores of the Bay should be developed in accordance with the Public Access Guidelines.	YES	The Public Access Guidelines require maximum feasible access along the waterfront, except where public access is clearly inconsistent with the project because of public safety considerations. The proposed project would prohibit public access to the site and waterfront for safety reasons. However, the Applicant has committed to improving public access to the waterfront through the implementation of landscaping in Warm Water Cove Park (Applicant Mitigation Measure VIS-4 and staff recommended Condition of Certification VIS-3).
Policy 2	All bayfront development should be designed to enhance the pleasure of the user or viewer of the Bay. Maximum efforts should be made to provide, enhance, or preserve	YES	The project with mitigation would comply with Policy 2 and Policy 4 (see below) due to efforts to minimize blockage of views to the Bay, and to reflect the historic character of the industrial

**VISUAL RESOURCES Table 8**  
**Proposed Project's Consistency with**  
**State and Local LORS Applicable to Visual Resources**

<b>LORS</b>		<b>Consistency Determination Before Mitigation</b>	<b>Basis for Consistency</b>
<b>Policy No.</b>	<b>Policy Description</b>		
	views of the Bay and shoreline, especially from public areas, the Bay, and the opposite shore. To this end, planning of waterfront development should include participation by professionals who are knowledgeable of the Commission's concerns, such as landscape architects, urban designers, or engineers and professionals in other fields.		waterfront. Landscape architects have been involved in the development of these design mitigations. The modified design of the proposed project (Applicant Mitigation Measure VIS-6 and staff's recommended Condition of Certification VIS-1) would provide a less utilitarian appearance to the lower power plant facilities and streetscape. Sightlines to the Bay would be retained between the HRSG structures, and some additional minor views of the Bay would be obtained through the removal of Station A. Furthermore, the project would be evaluated by the appropriate City and County of San Francisco (CCSF) planning officials to determine exact design requirements prior to construction.
Policy 4	Structures and facilities that do not take advantage of or visually complement the Bay should be located and designed so as not to impact visually on the Bay and shoreline. In particular, parking areas should be located away from the shoreline. However, some small parking areas for fishing access and Bay viewing may be allowed in exposed locations.	YES	See Policy 2
Policy 8	Shoreline developments should be built in clusters, leaving open areas around them to permit more frequent views of the Bay. Developments along the shores of tributary waterways should be designed to preserve and enhance views along the waterways, so as to provide maximum visual contact with the Bay.	YES	The proposed project includes the development of new power generation facilities inland from the existing power plant. By locating the new facilities inland, and designing these new structures with the minimum feasible heights, the project would retain substantial visual contact with the Bay. The cooling water intake structure along the shoreline would be visible from the Bay but would be screened from inland views by existing shoreline structures. Also, removal of the Station A complex will open up additional sightlines to the Bay.
Policy 10	Towers, bridges, or other structures near or over the Bay should be designed as landmarks that suggest the location of the waterfront when it is not visible, especially in flat areas. But such landmarks should be low enough to assure the continued visual dominance of the hills around the Bay.	YES	The proposed project is not being designed as a waterfront landmark. However, as discussed in previous sections, project dominance would range from subordinate to co-dominant and would not compromise the visual dominance of the hills around the Bay.

**VISUAL RESOURCES Table 8**  
**Proposed Project's Consistency with**  
**State and Local LORS Applicable to Visual Resources**

<b>LORS</b>		<b>Consistency Determination Before Mitigation</b>	<b>Basis for Consistency</b>
<b>Policy No.</b>	<b>Policy Description</b>		
Policy 13	Local governments should be encouraged to eliminate inappropriate shoreline uses and poor quality shoreline conditions by regulation and by public actions (including development financed wholly or partly by public funds). The Commission should assist in this regard to the maximum feasible extent by providing advice on Bay-related appearance and design issues, and by coordinating the activities of the various agencies that may be involved with projects affecting the Bay and its appearance.	YES	The proposed project has been located at an appropriate site with similar visual characteristics. Also, further consultation with the BCDC and the CCSF Planning Department would occur prior to project construction as described in Applicant Mitigation Measures VIS-1 and VIS-2.
Policy 14	Views of the Bay from vista points and roads should be maintained by appropriate arrangements and heights of all developments and landscaping between the view areas and the water. In this regard, particular attention should be given to all waterfront locations, areas below vista points, and areas along roads that provide good views of the Bay for travelers, particularly areas below roads coming over ridges and providing a "first view" of the Bay.	YES	The proposed project would not cause a substantial blockage of views from local roads or Interstates 80 and 280 in the project vicinity. Views from the Potrero Hill area, which is considered a vista point, would be only slightly affected as the additional blockage of views caused by the new facilities would be partially offset by the removal of the existing blockage caused by the Station A complex.
<b>CALIFORNIA STATE DEPARTMENT OF TRANSPORTATION (CALTRANS)</b>			
Scenic Highway Program	Segments of Interstate-80 and Interstate-280 near the proposed project are eligible for scenic highway designation. Protection of scenic qualities along designated scenic highways is the responsibility of the local agency, via an approved scenic corridor protection plan and local ordinances.	YES	No local agency has applied to Caltrans to designate these sections of highway as Scenic and therefore, no specific policies have been implemented to protect scenic qualities in these corridors. However, views toward the project from either the Bay Bridge (I-80) or I-280 are for the most part distant or partially blocked. No significant visual impacts would occur to the views from either of these highway

**VISUAL RESOURCES Table 8**  
**Proposed Project's Consistency with**  
**State and Local LORS Applicable to Visual Resources**

<b>LORS</b>		<b>Consistency Determination Before Mitigation</b>	<b>Basis for Consistency</b>
<b>Policy No.</b>	<b>Policy Description</b>		
			segments.
<b>CITY AND COUNTY OF SAN FRANCISCO – WATERFRONT LAND USE PLAN</b>			
Policy 1, View Sites	Establish new views at specific points or areas that afford exceptional views of the Bay, waterfront, and City.	YES	The proposed project is not located on a site selected for a new view of the City or Bay, as designated with the Waterfront Design and Access Element.
Policy 2, Street Views	Streets connecting to the waterfront should have views of the Bay, historic structures, or architecture that provide a waterfront identity.	YES	The existing and future street views protected within the Waterfront Design and Access Element are north of the proposed project site. The southernmost protected street view is on 20 <sup>th</sup> Street, looking toward the Bay (east). Views to the southeast, toward the proposed project, would be partially to fully screened by adjacent structures. For those views where the project structures would be visible, the slight additional blockage of Bay views caused by the new facilities would be partially offset by the removal of the existing blockage caused by the Station A complex.
<b>CITY AND COUNTY OF SAN FRANCISCO – SAN FRANCISCO MASTER PLAN</b>			
Objective 1, Policy 1	Encourage development, which provides substantial net benefits and minimizes undesirable consequences. Discourage development, which has substantial undesirable consequences that cannot be mitigated.	YES	With implementation of both Applicant and staff mitigation measures, the proposed project would not cause substantial undesirable visual consequences or significant visual impacts.
Objective 1, Policy 2	Assure that all commercial and industrial uses meet minimum reasonable performance standards.	YES	The proposed project would have an industrial appearance consistent with the industrial nature of the existing power plant and surrounding historic waterfront area.
<b>CITY AND COUNTY OF SAN FRANCISCO – RECREATION AND OPEN SPACE ELEMENT</b>			
Objective 3, Policy 1	Assure that new development adjacent to the shoreline capitalizes on its unique waterfront location, considers shoreline land use provisions, improves visual and physical access to the water and conforms with urban design policies.	YES	The proposed project is appropriately located at an existing power plant site with similar visual characteristics. The Applicant's commitment to coordinate with CCSF and BCDC officials (Applicant Mitigation Measures VIS-1 and VIS-2), as augmented by staff's recommendations, would help to ensure that the proposed project would meet urban design requirements and shoreline land use provisions. The design treatment envisaged in Applicant Mitigation Measure VIS-6, as augmented by staff's recommended Condition of Certification VIS-1, would reflect the historic character of the industrial waterfront area. Further, the landscaping of Warm Water Cove Park as described in Applicant Mitigation

**VISUAL RESOURCES Table 8**  
**Proposed Project's Consistency with**  
**State and Local LORS Applicable to Visual Resources**

LORS		Consistency Determination Before Mitigation	Basis for Consistency
Policy No.	Policy Description		
			Measure VIS-4, and augmented by staff's recommended Condition of Certification VIS-3, would partially mitigate adverse visual effects by enhancing physical access to the Bay. The removal of the view blockage associated with the Station A complex would also open up new sightlines to the Bay.
<b>CITY AND COUNTY OF SAN FRANCISCO – URBAN DESIGN ELEMENT</b>			
Objective 1, Policy 1	Recognize and protect major views in the city, with particular attention to those of open space and water.	YES	Important views near the proposed project that are identified in the Master Plan include Hunters Point and Potrero Hill. Significant visual impacts would not occur to either of these areas as discussed previously in this analysis. Although a slight increase in view blockage would occur for some views from Potrero Hill, the view blockage would be partially offset by the elimination of the blockage caused by the existing Station A. Implementation of both Applicant Mitigation Measures (VIS-1 and VIS-6) and staff recommended Condition of Certification VIS-1 would further reduce the proposed project's adverse but not significant visual impacts on views from these areas.
Objective 1, Policy 3	Recognize that buildings, when seen together, produce a total effect that characterizes the city and its districts.	YES	The proposed project would not change the character of the predominantly industrial waterfront. The design of the surface/architectural treatment of the HRSG units (Applicant Mitigation Measure VIS-6 and staff's recommended Condition of Certification VIS-1) would reflect the historical industrial appearance of the surrounding area.
Objective 2, Policy 3	Avoid encroachment on San Francisco Bay that would be inconsistent with the Bay Plan or the needs of the city's residents.	YES	The proposed project includes a cooling water intake and discharge structure that would be located along the shoreline of the Bay. As discussed above, the proposed project would be consistent with the Bay Plan policies relevant to visual resources. Also, the intake/discharge structure would be minimally visible to land based views, and would therefore, not be inconsistent with the needs of the city's residents.
Objective 2, Policy 6	Respect the character of older development nearby in the design of new buildings.	YES	The proposed project design would appear consistent with the visual characteristics already established on the site by the existing power plant. Also, the proposed HRSG structure surface/architectural treatment (Applicant Mitigation Measure VIS-6 and staff's
Objective 2, Policy 7	Recognize and protect outstanding and unique areas that contribute in an extraordinary degree to San	YES	

**VISUAL RESOURCES Table 8**  
**Proposed Project's Consistency with**  
**State and Local LORS Applicable to Visual Resources**

<b>LORS</b>		<b>Consistency Determination Before Mitigation</b>	<b>Basis for Consistency</b>
<b>Policy No.</b>	<b>Policy Description</b>		
Objective 3, Policy 1	Francisco's visual form and character.	YES	recommended Condition of Certification VIS-1) would be designed to reflect an industrial, yet historic character (derived from local historical precedents) to complement nearby buildings and the waterfront. The proposed project stacks would also be shorter than the existing stack, ensuring that the new facilities would not appear dominant in the area. In summary, consistency with these policies would be achieved through implementation of the Applicant's proposed Mitigation Measures as augmented by staff's recommendations.
Objective 3, Policy 2	Promote harmony in the visual relationships and transitions between new and older buildings.	YES	
Objective 3, Policy 3	Avoid extreme contrasts in color, shape and other characteristics, which will cause new buildings to stand out in excess of their public importance.	YES	
Objective 3, Policy 4	Promote efforts to achieve high quality of design for buildings to be constructed at prominent locations.		
Objective 3, Policy 4	Promote building forms that will respect and improve the integrity of open spaces and other public areas.	NO	Warm Water Cove Park is located south of the project site. The proposed project would introduce prominent complex forms with strong vertical lines into the view from the park. The resulting moderate degree of visual contrast and view blockage would cause an adverse but not significant visual impact. However, landscape improvements made as part of Applicant Mitigation Measure VIS-4, as augmented by staff's recommended Condition of Certification VIS-3, would improve visual quality and integrity of the open space at the park.
Objective 3, Policy 5	Relate the height of buildings to important attributes of the city pattern and to the height and character of existing development.	PARTIALLY	The Urban Design Element outlines recommendations for height and bulk requirements throughout the city. The range suggested for maximum heights is 41-88 feet; the range for bulk (front and diagonal dimensions) would depend on building height. With a building height exceeding 60 feet, the maximum plan dimension recommended is 250 feet. The maximum diagonal plan dimension recommended is 300 feet. Although, the proposed project would exceed these dimensions, in the context of the adjacent power plant and industrial structures, the proposed project would not appear overwhelming nor would it dominate the existing industrial waterfront landscape.
Objective 3, Policy 6	Relate the bulk of buildings to the prevailing scale of development to avoid an overwhelming or dominating appearance in new construction.		
Objective 3, Policy 7	Recognize the special urban design problems posed in development of large properties.	YES	The surface/architectural treatment proposed as part of the Applicant's Mitigation Measure VIS-6, as augmented by staff's recommended

**VISUAL RESOURCES Table 8**  
**Proposed Project's Consistency with**  
**State and Local LORS Applicable to Visual Resources**

<b>LORS</b>		<b>Consistency Determination Before Mitigation</b>	<b>Basis for Consistency</b>
<b>Policy No.</b>	<b>Policy Description</b>		
			Condition of Certification VIS-1, would help to mitigate the visual contrast and prominence of the new structures.
Objective 4, Policy 12	Install, promote, and maintain landscaping in public and private areas.	YES	Although the proposed project does not include on-site landscaping, it will provide for the off-site landscaping of Warm Water Cove as described in Applicant Mitigation Measure VIS-6 and augmented by staff's recommended Condition of Certification VIS-3. Landscaping will also be provided along 23 <sup>rd</sup> Street under Applicant Mitigation Measures VIS-5.
Objective 4, Policy 14	Remove and obscure distracting and cluttering elements.	YES	The proposed project will include the removal of the Station A structures and the shop building. The project will also include the introduction of several new structures. Some of these structures will be at least partially screened by the existing facilities. Overall, the proposed project will not cause the introduction of distracting or cluttering elements.
Objective 4, Policy 15	Protect the livability and character of residential properties from intrusion of incompatible new buildings.	YES	The proposed project is not located within a residential area and the nearest residence is approximately 1,000 feet distant from the site. At this distance, the proposed facilities would not cause any shadowing over residences. Additionally, lighting for the new facilities would be effectively controlled with implementation of the Applicant's Mitigation Measure VIS-3, as augmented by staff's recommended Condition of Certification VIS-2. Overall, the proposed facilities would be consistent with existing facilities on the site and would not adversely affect either the livability or character of nearby residential properties.
<b>CITY AND COUNTY OF SAN FRANCISCO – CENTRAL WATERFRONT AREA PLAN</b>			
Objective 10, Policy 1	Reinforce the visual contrast between the waterfront and hills by limiting the height of structures near the shoreline. Relate the height and bulk of new structures away from the shoreline to the character of the topography and existing development.	PARTIALLY	The proposed project will include the introduction of two 180-foot tall HRSG exhaust stacks in close proximity to the shoreline. However, these new structures would appear consistent with the existing Unit 3 structures in terms of character and would be subordinate in terms of scale.
Objective 10, Policy 2	Protect and create views of the downtown skyline and the Bay. Design and locate new development to minimize obstruction of existing views.	YES	The proposed facilities would fit within the industrial context of the area and would minimize obstruction of views to the Bay. Additionally, removal of the existing Station A complex would open up new

**VISUAL RESOURCES Table 8**  
**Proposed Project's Consistency with**  
**State and Local LORS Applicable to Visual Resources**

LORS		Consistency Determination Before Mitigation	Basis for Consistency
Policy No.	Policy Description		
			sightlines to the Bay.
Objective 10, Policy 3	Encourage the rehabilitation of architecturally or historically significant buildings with reuse potential	YES	There are no opportunities for reuse of older buildings as part of this project. The existing Station A complex is being removed for safety reasons.
Objective 10, Policy 4	Encourage the inclusion of recreational facilities, outdoor leisure areas, and public open spaces in new private developments.	YES	Although the proposed project does not include recreational facilities or open space, implementation of Applicant Mitigation Measure VIS-4, as augmented by staff's recommended Condition of Certification VIS-3, would provide for landscaping and recreational improvements to Warm Water Cove Park.
Objective 16, Policy 2	Assure that any power plant expansion on the Pacific Gas and Electric Company site will provide additional employment and will not adversely affect the environment.	YES	With implementation of the Applicant's proposed mitigation measures as augmented by staff's mitigation measures and recommendations, the proposed project would not cause any significant visual impacts.
Objective 17, Policy 1	Maintain and improve existing recreational improvements at Warm Water Cove and expand to adjacent waterfront properties. Develop a waterfront picnic area and fishing pier at 24 <sup>th</sup> Street. Provide public access along the north side of the Cove and construct a fishing quay at the Bay. Shield the recreation area from surrounding industrial uses by providing attractive landscaping.	YES	The proposed project with its associated mitigation measures, as augmented by staff's recommendations, would achieve compliance with this policy. Applicant proposed Mitigation Measure VIS-4, as augmented by staff's recommended Condition of Certification VIS-3, would create landscaping within Warm Water Cove Park to visually shield the park from the project and nearby industrial uses.
Objective 18 Policy 1	Minimize blockage of private and public views and maintain, to the extent feasible, sightlines from Potrero Hill and Mission Bay to the waterfront and downtown.	YES	The proposed project results in a slight increase in view blockage of the Bay and the East Bay Hills when viewed from Potrero Hill. However, this impact is partially (though not completely) mitigated by elimination of the view blockage caused by the existing Station A complex which also opens up additional sightlines to the Bay from Potrero Hill. The resulting view blockage visual impact, while adverse, would not be significant.

## RESPONSES TO PUBLIC AND AGENCY COMMENTS ON THE PSA

### CITY AND COUNTY OF SAN FRANCISCO (CCSF)

**CCSF-13A:** *The proposed project has a significant impact on Bay views. The proposed project and smokestacks would impact views of the Bay and views from the*



*Bay, by creating highly visible structures in the viewshed of the surrounding residential communities of Dogpatch, Potrero Hill and Bayview/Hunters Point. The proposed power plant and smokestacks would be visible from sensitive viewing areas such as Warm Water Cove and Agua Vista Park that are an important part of the openspace and public access network in the area.*

As discussed in CCSF's Land Use comments, the PSA is incomplete in so far as it does not include a review or analysis by the Bay Conservation and Development Commission (BCDC) of the impact of the project on views of the Bay and public access and open space. CCSF reserves further comment until it has an opportunity to review and analyze the comments and proposed mitigations by BCDC.

**Response:** The impact section of the Visual Resources PSA (and this FSA) concludes that adverse visual impacts would occur from the locations referenced in the above comment. However, these adverse visual impacts are not classified as significant for the following reasons: (1) the existing landscape setting is industrial in appearance with forms, lines, and characteristics similar to those of the proposed project components including the HRSG structures and switchyard, resulting in low to moderate degrees of visual contrast depending on viewpoint; (2) viewing distances are such that the proposed project would appear subordinate to co-dominant; (3) although portions of San Francisco Bay and the East Bay Hills would be blocked from view by the proposed project, removal of the Station A building would open up additional sight lines to the Bay and hills such that, while there might be a slight increase in net view blockage, views of the Bay actually appear to be more open and unobstructed.

Responses to BCDC visual resources comments are provided later in this section.

**CCSF-13B:** *The applicant should contribute to the development and implementation of streetscape improvements. The Applicant should contribute to the development and implementation of a plan for urban design/streetscape improvements and treatments that would help buffer the proposed power plant from other incompatible land uses in close proximity to the project and the Southern Waterfront. This plan could include the undergrounding of existing utility lines in the Potrero Hill, Dogpatch, and Bayview areas.*

*The PSA should require the Applicant to undertake an urban forestry or similar landscape improvement project throughout the Dogpatch neighborhood, Pier 70 areas, and Southern Waterfront. Proposed mitigation measure VIS-5 should be expanded to indicate that streetscaping should also be designed to engender a comfortable pedestrian approach to the 23rd Street terminus at the Bay. The Applicant should provide landscaping (for instance, benches and trees) at the terminus of 23rd and the Bay that creates a destination for workers and visitors to the area and provides access to the Bay. To the extent possible, this new open space should be connected to Warm Water Cove and linked to the Bay Trail.*

*Nighttime illumination of the power plant will increase the backscatter to the sky. The Applicant should, in consultation with community representatives and neighboring property owners, develop and implement a lighting plan to minimize the trespass of unwanted glare visible from residential areas.*

**Response:** Staff has concluded that the project as proposed with Applicant's Mitigation Measures VIS-1 through VIS-6 would not result in significant adverse visual impacts. However, staff has further augmented the Applicant's mitigation proposals with more comprehensive Conditions of Certification which address the need to meet the requirements of the City and County of San Francisco and BCDC, landscaping along 23rd Street, view screening from Warm Water Cove Park, and the management and shielding of night lighting. No additional mitigation is recommended.

## **PIER 70 CITIZENS ADVISORY GROUP (P70)**

**P70-7D:** *The proposed power plant and smokestacks would be visible from sensitive viewing areas such as Warm Water Cove and Agua Vista Parks. Mirant should fund the restoration or removal of the derelict piers that make up the eastern portion of Pier 70, including the removal of Pier 5 within the San Francisco Drydock leasehold at an estimated cost of \$500,000 to \$750,000.*

**Response:** Please see responses to Comments CCSF-13A and 13B above.

**P70-7E:** *The PG&E Switch Yard and Substation bounded by Humbolt, Illinois and 23rd Streets is unsightly. Mirant should develop and implement an appropriate screening plan in collaboration with the community and neighboring property owners. The screening plan should include but not be limited to physical improvements such as walls, structures, fencing and landscaping.*

**Response:** Please see responses to Comments CCSF-13A and 13B above.

**P70-7F:** *The two proposed 180-foot smokestacks would negatively impact the visual quality of the Southern Waterfront. [The Applicant should] establish an urban forestry and/or similar landscape improvement projects throughout the Dogpatch neighborhood, Pier 70 area and Southern Waterfront.*

**Response:** Please see responses to Comments CCSF-13A and 13B above.

**P70-7G:** *Nighttime illumination of the power plant would increase the backscatter to the sky. [The Applicant should] develop and implement a lighting plan with community representatives and neighboring property owners to minimize the trespass of unwanted glare visible from residential areas.*

**Response:** Please see responses to Comments CCSF-13A and 13B above.

## **SAN FRANCISCO BAY CONSERVATION AND DEVELOPMENT COMMISSION (BCDC)**

**BCDC-15:** *The Bay Plan policies on Appearance, Design and Scenic Views state that, "[t]o enhance the visual quality of development around the Bay and to take maximum advantage of the attractive setting it provides, the shores of the Bay should be developed in accordance with the Public Access Design Guidelines.....All bayfront development should be designed to enhance the pleasure of the user or viewer of the Bay and maximum efforts should be made to provide, enhance, or preserve views of the Bay and shoreline, especially from public areas, from the Bay itself, and from the opposite shore" (Policies 1 and 2).*

*As established in the public access findings above, the requirements of the cooling water intake structure and other power plant structures, such as the switchyard, would*

*make it impossible to design the structures to enhance the pleasure of the user or viewer of the Bay or preserve views of the Bay and shoreline. In order to ensure that the public access discussed above or another public access proposal made by the applicant is consistent with the Public Access Design Guidelines, the public access should be reviewed by the Commission's Design Review Board.*

*The Visual Resources analysis contained in the CEC's PSA addresses visual viewer exposure to power plant facilities from the Bay Trail, but does not address the cumulative impacts of additional structures on the existing power plant site on views to the open space of the Bay from Illinois Street, the designated Bay Trail alignment. While there are only some places where the Bay water can be seen from Illinois Street, the open space across the project site makes the location of the Bay clear to the Bay Trail user. The increased density of structures on the project site may impede visual access to the extent that Bay Trail users cannot even perceive the open space over the Bay.*

*The PSA Visual Resources analysis, using photographs of the existing project shoreline from the Bay and superimposing the projected project structures onto the photographs, concluded that viewer exposure of the structures from the Bay and viewer concern regarding shoreline landscape changes is "moderate." The CEC's analysis was performed before the revised project plans were completed. Although, from the Bay, the visible structures from the Bay are in keeping with the industrial nature of the site, the BCDC staff believes that the change in shoreline configuration from sloping riprap to a 207-foot-long concrete box, with a gantry crane, 16 raised fish screens, and four pumps, is significant. In addition, the relocated intake structure would now be adjacent to one of the few vegetated areas of the shoreline near the project site and incongruous with that area. Because the CEC did not have the revised project plans, it based its analysis on the former location of the intake structure and at that time the structure as superimposed on the photographs did not show the gantry crane and other associated machinery (Exhibit K).*

**Response:** Staff agrees that neither the existing site nor the project as proposed would "enhance the pleasure of the user or viewer of the Bay." However, staff disagrees that the proposed project would prevent the preservation views of the Bay and shoreline, "especially from public areas, from the Bay itself, and from the opposite shore." Presently, the only view of Bay waters from Illinois Street in the project vicinity is looking down 23rd Street. Looking across the project site, views of the Bay are blocked by structures, with the existing Station A complex forming an imposing visual barrier across much of the site. Under the present circumstances, a Bay Trail user would have no greater sense of the Bay's location when viewing across the project site than other views from Illinois Street in the project vicinity. However, with the proposed project, views across the site from the Bay Trail along Illinois Street would actually appear more open even with the addition of the new HRSG facilities due to the removal of the Station A complex and creation of new sight lines through the project site. This aspect of the proposed project would reduce site structural density, improve visual access across the site, and enhance Bay Trail users' perception of open space over the Bay.

It is also acknowledged that the introduction of the water intake facility into the shoreline landscape (as viewed from the Bay) would result in an adverse visual impact. However, in the context of the existing complex industrial character of the project site and

surroundings (which would backdrop the intake structure), the appearance of the intake structure and associated equipment (gantry crane and pumps) would not cause a sufficiently adverse visual change, even in its revised location to the south, such that a significant visual impact would occur. Specifically, the water intake facilities would not result in a high degree of visual contrast or view blockage and would not be a dominant structure in the landscape. Thus, while the visual impact would be adverse, it would not be significant and views of the shoreline from the Bay would not be significantly degraded.

## MITIGATION

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### APPLICANT'S PROPOSED MITIGATION MEASURES

The Applicant has proposed six mitigation measures to be incorporated into the project design to minimize visual impacts associated with the operation of the facility:

**VIS-1:** The project will meet or exceed the applicable City and County of San Francisco (CCSF) Design Guidelines for project features such as structures, signs, and landscaping. These guidelines are project-specific and therefore, will be evaluated by the appropriate CCSF planning officials to determine exact design requirements prior to construction.

**VIS-2:** The project proponent will consult with the Bay Conservation and Development Commission (BCDC) to ensure coordinated compliance with BCDC project-specific requirements and those of CCSF.

**VIS-3:** No longer applicable due to project description change.

**VIS-4:** Exterior lighting will be limited to areas required by regulations, operations, and safety. Low-intensity lights will be used where allowed by regulations (e.g., site perimeter and parking areas). High-intensity lighting will be limited to areas where such lighting is necessary for operations and safety concerns (e.g., checking plant equipment). A higher proportion of lighting will be directed and/or shielded to reduce glare towards sensitive viewers.

**VIS-5:** Offsite landscaping within Warm Water Cove Park, including substantial planting of trees and shrubs, will be used to filter and screen views toward the proposed project, and instead focus views on the Bay.

**VIS-6:** Additional landscaping and provision of street trees along 23rd Street east of Third Street to improve the approach to the plant site and to help screen the switchyard facilities at the west end of the site. Human-scale brick wall details will provide continuity with streetscaping for pedestrians. An architectural historian with local expertise should be retained to provide advice on design consistency.

**VIS-7:** Surface treatment of the HRSG buildings will be provided so as to reduce their visual contrast and utilitarian appearance, and improve their compatibility with the historic and developing character of the industrial waterfront neighborhood. The HRSG

stacks would be treated with a low reflectance surface and colored to darken them to a medium value, similar to the colors of the existing stack. The west and south faces of the HRSG buildings would receive surface color and/or limited architectural treatment on the lower two-thirds of the structures to provide colors, details, and other urban design qualities consistent with the historic industrial setting (e.g. reflecting the colors and textures of Station A) and waterfront locations.

It should be noted that while the Applicant's proposed mitigation measure sequential numbering system is the same as staff's Conditions of Certification sequential numbering system, the actual numbers do not coincide. Mitigation Measures VIS-1 through VIS-3 are not addressed in the Conditions of Certification. Mitigation Measure VIS-4 is addressed by Condition VIS-2. Mitigation Measures VIS-5 and VIS-6 are addressed by Condition VIS-3. Mitigation Measure VIS-7 is addressed by Condition VIS-1.

## **ADDITIONAL MITIGATION**

Energy Commission staff generally agrees with the Applicant's proposals. However, staff's position is that some of these proposals need to be more precisely developed and in some cases expanded in conditions of certification, which staff proposes below.

In addition, staff proposes one additional mitigation measure:

**VIS-8:** During project construction, all high-profile construction equipment, including cranes, are to be lowered and/or relocated on-site when not in use in order to reduce the potential for adverse visual impacts.

## **CONCLUSIONS AND RECOMMENDATIONS**

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Staff concludes that without mitigation the proposed project would cause adverse but not significant visual impacts. However, effective implementation of the Applicant and staff proposed mitigation measures, and staff's recommended conditions of certification, would reduce the adverse visual impacts that would be caused by the project. Staff also concludes that the proposed mitigation, as augmented by staff's recommended conditions of certification, would bring the project into compliance with applicable laws, ordinances, regulations, and standards regarding visual resources.

Staff recommends that the Energy Commission adopt the following Conditions of Certification if it approves the project.

## **PROPOSED CONDITIONS OF CERTIFICATION**

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**VIS-1** Prior to first turbine roll, the project structures, buildings, and stacks shall receive appropriate surface treatment with respect to color, texture, and limited architectural design that minimize visual intrusion and contrast by blending the proposed facilities with the surrounding landscape. This is to be accomplished in a fashion that is consistent with the developing and historic waterfront industrial setting, including any necessary perimeter brick wall details that will provide

continuity with streetscaping for pedestrians. An architectural historian with local expertise shall be retained to provide advice on design consistency.

Protocol: The project owner shall submit a treatment plan for the project to the California Energy Commission Compliance Project Manager (CPM) for review and approval. The treatment plan shall include:

- specifications, and 11" x 17" color simulations at life-size scale, of the treatment proposed for use on project structures, including structures treated during manufacture;
- a list of each major project structure, building, and tank, specifying the treatment(s) proposed for each item;
- documentation that a non-reflective finish will be used on all project elements visible to the public;
- a detailed schedule for completion of the treatment;
- a procedure to ensure proper treatment maintenance for the life of the project, and
- evidence that the treatment plan has been reviewed by the Bay Conservation and Development Commission and the City and County of San Francisco.

If the CPM notifies the project owner that revisions of the plan are needed before the CPM will approve the plan, the project owner shall submit a revised plan to the CPM.

After approval of the plan by the CPM, the project owner shall implement the plan according to the schedule and shall ensure that the treatment is properly maintained for the life of the project.

For any structures that are treated during manufacture, the project owner shall not specify the treatment of such structures to the vendors until the project owner receives notification of approval of the treatment plan by the CPM.

The project owner shall not perform the final treatment on any structures until the project owner receives notification of approval of the treatment plan from the CPM.

**Verification:** At least 60 (sixty) days prior to ordering the first structures that are color treated during manufacture, the project owner shall submit its proposed plan to the CPM for review and approval.

If the CPM notifies the project owner that any revisions of the plan are needed before the CPM will approve the plan, within 30 days of receiving that notification, the project owner shall submit to the CPM a revised plan.

Not less than thirty (30) days prior to first turbine roll, the project owner shall notify the CPM that all structures treated during manufacture and all structures treated in the field are ready for inspection.

The project owner shall provide a status report regarding treatment maintenance in the Annual Compliance Report.

**VIS-2** Prior to first turbine roll, the project owner shall design and install all lighting such that light bulbs and reflectors are not visible from public viewing areas and illumination of the vicinity and the nighttime sky is minimized during both project construction and operation.

Protocol: The project owner shall develop and submit a lighting plan for the project to the CPM for review and approval. The lighting plan shall require that:

- Lighting is designed so that exterior light fixtures are hooded, with lights directed downward or toward the area to be illuminated and so that backscatter to the nighttime sky is minimized. The design of this outdoor lighting shall be such that the luminescence or light source is shielded to prevent light trespass outside the project boundary;
- High illumination areas not occupied on a continuous basis such as maintenance platforms or the main entrance are provided with switches or motion detectors to light the area only when occupied;
- A lighting complaint resolution form (following the general format of that in Attachment 1) shall be used by plant operations, to record all lighting complaints received and document the resolution of those complaints. All records of lighting complaints shall be kept in the on-site compliance file.

If the CPM notifies the project owner that revisions of the plan are needed before the CPM will approve the plan, the project owner shall prepare and submit to the CPM a revised plan.

Lighting shall not be installed before the plan is approved. The project owner shall notify the CPM when the lighting has been installed and is ready for inspection.

**Verification:** At least 90 (ninety) days before ordering the exterior lighting, the project owner shall provide the lighting plan to the CPM for review and approval.

If the CPM notifies the project owner that any revisions of the plan are needed before the CPM will approve the plan, within 30 days of receiving that notification the project owner shall submit to the CPM a revised plan.

The project owner shall notify the CPM within seven days of completing exterior lighting installation that the lighting is ready for inspection.

**VIS-3:** The project owner shall provide a landscaping and screening plan (plan) to the California Energy Commission (CEC). Prior to submission to the CEC, the plan will have been reviewed by the San Francisco Bay Conservation and

Development Commission (BCDC). Comments made by the BCDC will be included with the plan. The plan must be effective in screening views toward the proposed project from Warm Water Cove Park. The plan must also provide for additional landscaping and the planting of trees along 23rd Street east of Third Street to improve the approach to the plant site and to help screen the switchyard facilities at the west end of the site.

Protocol: The project owner shall submit a landscaping plan to the CPM for review and approval. The plan shall include:

- 11 inch x17 inch color simulations of the proposed landscaping showing landscaping at five years and at maturity if the time to maturity is longer than five years;
- A detailed list of plants to be used and times to maturity; and
- Evidence that the plan has been reviewed by the San Francisco Bay Conservation and Development Commission (BCDC). The evidence will include, but not be limited to, the BCDC's comments on the plan.

If the CPM notifies the project owner that revisions of the plan are needed before the CPM will approve the submittal, the project owner shall submit to the CPM a revised plan.

The project owner shall not implement the plan until the project owner receives approval of the submittal from the CPM.

**Verification:** At least 60 (sixty) days prior to installing the landscaping, the project owner shall submit the plan to the CPM for review and approval.

If the CPM notifies the project owner that revisions of the submittal are needed before the CPM will approve the submittal, within 30 days of receiving that notification, the project owner shall prepare and submit to the CPM a revised submittal.

The project owner shall notify the CPM within 7 (seven) days after completing installation of the landscaping, that the landscaping is ready for inspection.

**VIS-4** During project construction, the project owner shall lower and/or relocate on-site, all high-profile construction equipment, including cranes, when not in use in order to reduce the potential for adverse visual impacts.

Protocol: The project owner shall submit a construction equipment management plan (plan) to the CPM for review and approval. The plan must identify all high-profile equipment to be used during construction and the conditions under which the equipment will be lowered and/or relocated on-site.

If the CPM notifies the project owner that revisions of the plan are needed before the CPM will approve the submittal, the project owner shall submit to the CPM a revised plan.



The project owner shall not implement the plan until the project owner receives approval of the submittal from the CPM.

**Verification:** At least 60 (sixty) days prior to start of construction, the project owner shall submit the plan to the CPM for review and approval.

If the CPM notifies the project owner that revisions of the plan are needed before the CPM will approve the submittal, within 30 days of receiving that notification, the project owner shall prepare and submit to the CPM a revised submittal.

The project owner shall notify the CPM when the first equipment subject to the plan arrives on site.

**VIS-5** All fencing for the project shall be non-reflective.

**Protocol:** Prior to ordering the fencing the project owner shall submit to the CPM for review and approval the specifications for the fencing documenting that such fencing will be non-reflective.

If the CPM notifies the project owner that revisions of the specifications are needed before the CPM will approve the submittal, the project owner shall submit to the CPM revised specifications.

The project owner shall not order the fencing until the project owner receives approval of the fencing submittal from the CPM.

The project owner shall notify the CPM within one week after the fencing has been installed and is ready for inspection.

**Verification:** Prior to first turbine roll and at least 30 (thirty) days prior to ordering the non-reflective fencing, the project owner shall submit the specifications to the CPM for review and approval.

If the CPM notifies the project owner that revisions of the submittal are needed before the CPM will approve the submittal, within 30 days of receiving that notification, the project owner shall prepare and submit to the CPM a revised submittal.

The project owner shall notify the CPM within seven days after completing installation of the fencing that the fencing is ready for inspection.

## **REFERENCES**

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MIRANT (Mirant Corp.). 2001f. Supplemental Information to the Application for Certification, Potrero Power Plant Unit 7 Project (00-AFC-4). Addresses options for Visual Resources Key Observation Points 1B and 3. Submitted to the California Energy Commission, May 8, 2001.

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the proposed project. Submitted to the California Energy Commission, April 20, 2001.

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USDI, BLM. 1986b. Visual Contrast Rating Manual. USDI, BLM.

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## ATTACHMENT 1

### LIGHTING COMPLAINT RESOLUTION FORM

POTRERO POWER PLANT PROJECT San Francisco County, California	
Complainant's name and address:	
Phone number:	
Date complaint received:	
Time complaint received:	
Nature of lighting complaint:	
Definition of problem after investigation by plant personnel:	
Date complainant first contacted:	
Description of corrective measures taken:	
Complainant's signature: _____	Date: _____
Approximate installed cost of corrective measures: \$ _____	
Date installation completed: _____	
Date first letter sent to complainant: _____ (copy attached)	
Date final letter sent to complainant: _____ (copy attached)	
This information is certified to be correct:	
Plant Manager's Signature: _____	

(Attach additional pages and supporting documentation, as required.)

APPENDIX A  
POTRERO POWER PLANT UNIT 7 PROJECT  
STAFF ASSESSMENT - VISUAL ANALYSIS SUMMARY

VIEWPOINT		EXISTING VISUAL SETTING								VISUAL IMPACT					IMPACT SIGNIFICANCE		
Key Observation Point (KOP)	Description	Visual Quality	Viewer Concern	Viewer Exposure					Overall Visual Sensitivity	Description	Visual Contrast	Project Dominance	View Blockage	Overall Visual Change	Impact Significance Before Mitigation	Mitigation / Conditions	Impact Significance After Mitigation
				Visibility	Distance Zone	Number of Viewers	Duration of View	Overall Viewer Exposure									
<b>KOP 1</b> POTRERO HILL WATCHMAN WAY NEIGHBORHOOD	View to east from the cul-de-sac on Watchman Way.	<b>Moderate</b> Panoramic view of the San Francisco waterfront area, backdropped by the Bay and East Bay Hills.	<b>High</b> View is representative of the direct, unobstructed foreground view available to nearby residents.	High	Foreground	Low	Extended	Moderate	Moderate to High	Additional structures with prominent vertical forms and lines. Industrial character of the proposed project would be similar to that already established in the landscape. Noticeable increase in visible light at night.	Moderate	Co-Dominant	Low to Moderate	Moderately Adverse	Adverse but Not Significant	VIS-1 VIS-2 VIS-3 VIS-6	Adverse but Not Significant
<b>KOP 2</b> POTRERO HILL 20 <sup>TH</sup> AND MISSISSIPPI NEIGHBORHOOD	View to the southeast from near the intersection of 20 <sup>th</sup> Street and Mississippi Street.	<b>Moderate</b> Vista View of the I-280/Third Street Neighborhood backdropped by the Bay and East Bay Hills.	<b>Moderate to High</b> Residents, pedestrians, and motorists anticipate a mixed-use urban landscape that includes existing similar industrial facilities.	Moderate to High	Foreground	Low to Moderate	Brief to Extended	Moderate	Moderate	Additional structures with prominent vertical forms and lines. Industrial character of the proposed project would be similar to that already established in the landscape. Noticeable increase in visible light at night.	Moderate	Co-Dominant	Low	Moderately Adverse	Adverse but Not Significant	VIS-1 VIS-2 VIS-3 VIS-6	Adverse but Not Significant
<b>KOP 3</b> I-280/ THIRD STREET NEIGHBORHOOD	View to the northeast from near the intersection of 25 <sup>th</sup> Street and Indiana Street.	<b>Low to Moderate</b> Elevated view of an urban landscape consisting of commercial and industrial visual elements.	<b>Low to Moderate</b> Residents, pedestrians, and motorists anticipate an urban landscape dominated by commercial and industrial visual character.	Moderate to High	Foreground	Low	Extended	Moderate	Low to Moderate	Additional structures with prominent vertical forms and lines. Industrial character of the proposed project would be similar to that already established in the landscape. Noticeable increase in visible light at night.	Moderate	Co-Dominant	Low to Moderate	Moderately Adverse	Adverse but Not Significant	VIS-1 VIS-2 VIS-3 VIS-6	Adverse but Not Significant
<b>KOP 4</b> HUNTERS POINT NEIGHBORHOOD	View to the north from near the intersection of Hudson Avenue and Ardath Court.	<b>Moderate</b> Panoramic view of San Francisco's eastern industrial waterfront area, backdropped by downtown highrises and the Bay.	<b>Moderate</b> Residents anticipate unobstructed views of the eastern waterfront, downtown highrises, and San Francisco Bay.	Moderate	Middleground	Moderate to High	Brief to Extended	Moderate	Moderate	Additional structures with vertical forms and lines would be minimally noticeable adjacent to the existing power plant.	Low	Subordinate	Low	Slightly Adverse	Adverse but Not Significant		Adverse but Not Significant
<b>KOP 5</b> BERNAL HEIGHTS NEIGHBORHOOD	View to the northeast from the pedestrian pathway near Brewster.	<b>Moderate</b> Panoramic view of San Francisco's eastern industrial waterfront area, backdropped by the Bay and East Bay Hills.	<b>Moderate</b> Residents anticipate unobstructed views of the eastern waterfront, San Francisco Bay, and East Bay Hills.	Low to Moderate	Middleground	Moderate	Brief to Extended	Low to Moderate	Low to Moderate	Visible new structures of similar industrial character, would be noticeable though not prominent in the middleground distance due to partial screening by intervening structures and terrain.	Low to Moderate	Subordinate	Low	Slightly Adverse	Adverse but Not Significant		Adverse but Not Significant
<b>KOP 6</b> BAYVIEW NEIGHBORHOOD	View to the northeast from the Silver Avenue / Thomas Avenue neighborhood.	<b>Low to Moderate</b> Panoramic view of San Francisco's eastern industrial waterfront area, backdropped by the Bay and East Bay Hills.	<b>Moderate</b> Residents and pedestrians anticipate unobstructed views of the eastern waterfront, San Francisco Bay, and East Bay Hills.	Moderate	Middleground	Low to Moderate	Brief to Extended	Low to Moderate	Low to Moderate	Visible new structures of similar structural form and industrial character, but smaller in scale compared to the existing Unit 3 stack.	Low to Moderate	Subordinate to Co-Dominant	Low	Moderately Adverse	Adverse but Not Significant		Adverse but Not Significant
<b>KOP 7</b> Pacific Bell Park	View to the south from Section 328/330	<b>Moderate</b> Panoramic view of San Francisco's eastern industrial waterfront area and San Francisco Bay.	<b>Low to Moderate</b> Though visitors focus on the field within the park, they also anticipate panoramic views of the waterfront, San Francisco Bay, and hills to the south.	Moderate	Middleground	Low to Moderate	Extended	Low to Moderate	Low to Moderate	Visible new structures of similar structural form and industrial character, but smaller in scale compared to the existing Unit 3 stack.	Low	Subordinate	Low	Slightly Adverse	Adverse but Not Significant		Adverse but Not Significant
<b>KOP 8</b> Agua Vista Park	View to the south from Aqua Vista Park at Central Basin, due north of the project site.	<b>Low to Moderate</b> View of maritime industrial area along the southern portion of Central Basin.	<b>Low to Moderate</b> Visitors focus on the immediate Bay landscape of Central Basin with views drawn primarily to the east. Viewers anticipate industrial landscape components.	Low to Moderate	Foreground	Low	Extended	Low to Moderate	Low to Moderate	Proposed structures would be slightly noticeable behind the warehouses located along the south side of Central Basin.	Low	Subordinate to Co-Dominant	Low	Slightly Adverse	Adverse but Not Significant		Adverse but Not Significant
<b>KOP 9</b> San Francisco Bay	View to the west from San Francisco Bay, approximately 1/2-mile northeast of the plant site.	<b>Low to Moderate</b> Panoramic view of San Francisco's eastern industrial waterfront area and San Francisco Bay.	<b>Moderate</b> Boaters focus on the Bay and waterfront shoreline.	Moderate to High	Foreground	Low to Moderate	Extended	Moderate	Moderate	Proposed structures would be clearly visible as foreground structures with industrial character.	Moderate	Co-Dominant	Low	Moderately Adverse	Adverse but Not Significant		Adverse but Not Significant



# WASTE MANAGEMENT

Testimony of Michael Ringer

## INTRODUCTION

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This analysis presents an assessment of issues associated with managing wastes generated from constructing and operating the Potrero Power Plant Unit 7 Project (Unit 7). It evaluates the proposed waste management plans and mitigation measures designed to reduce the risks and environmental impacts associated with handling, storing, and disposing of project-related hazardous and nonhazardous wastes. The technical scope of this analysis encompasses wastes generated during facility construction and operation, except wastewaters discharged to municipal treatment facilities or navigable waters. These are discussed in the **Soil and Water Resources** section of this document.

Energy Commission staff's objectives in its waste management analysis are to ensure that:

- The management of wastes will be in compliance with all applicable laws, ordinances, regulations, and standards (LORS). Compliance with LORS ensures that wastes generated during constructing and operating the proposed project will be managed in an environmentally safe manner; and
- Disposal of project wastes will not result in significant adverse impacts to existing waste disposal facilities.

## LAWS, ORDINANCES, REGULATIONS AND STANDARDS

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### FEDERAL

#### **Resource Conservation and Recovery Act (42 U.S.C. § 6922)**

RCRA establishes requirements for the management of hazardous wastes from the time of generation to the point of ultimate treatment or disposal. Section 6922 requires generators of hazardous waste to comply with requirements regarding:

- Record keeping practices which identify quantities of hazardous wastes generated and their disposition,
- Labeling practices and use of appropriate containers,
- Use of a manifest system for transportation, and
- Submission of periodic reports to the U.S. Environmental Protection Agency (USEPA) or authorized state.

#### **Title 40, Code of Federal Regulations, part 260**

These sections contain regulations promulgated by the USEPA to implement the requirements of RCRA as described above. Characteristics of hazardous waste are described in terms of ignitability, corrosivity, reactivity, and toxicity, and specific types of wastes are listed.

## STATE

### **California Health and Safety Code §25100 et seq. (Hazardous Waste Control Act of 1972, as amended).**

This act creates the framework under which hazardous wastes must be managed in California. It mandates the State Department of Health Services (now the Department of Toxic Substances Control under the California Environmental Protection Agency, or Cal EPA) to develop and publish a list of hazardous and extremely hazardous wastes, and to develop and adopt criteria and guidelines for the identification of such wastes. It also requires hazardous waste generators to file notification statements with Cal EPA and creates a manifest system to be used when transporting such wastes.

### **Title 14, California Code of Regulations, §17200 et seq. (Minimum Standards for Solid Waste Handling and Disposal)**

These regulations set forth minimum standards for solid waste handling and disposal, guidelines to ensure conformance of solid waste facilities with county solid waste management plans, as well as enforcement and administration provisions.

### **Title 22, California Code of Regulations, §66262.10 et seq. (Generator Standards)**

These sections establish requirements for generators of hazardous waste. Under these sections, waste generators must determine if their wastes are hazardous according to either specified characteristics or lists of wastes. As in the federal program, hazardous waste generators must obtain identification numbers, prepare manifests before transporting the waste off site, and use only permitted treatment, storage, and disposal facilities. Additionally, hazardous waste must only be handled by registered hazardous waste transporters. Generator requirements for record keeping, reporting, packaging, and labeling are also established.

## LOCAL

### **San Francisco Health Code Article 22A**

This article, known as the Maher ordinance, requires that, whenever more than 50 cubic yards of soil would be disturbed Bayward of the high tide line, an applicant for a building permit must provide a site history, sampling for hazardous waste, and a site mitigation report, if applicable.

## SETTING

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### **PROJECT AND SITE DESCRIPTION**

The Unit 7 project consists of a nominal 540-megawatt natural gas-fired combined cycle power plant proposed to be located within the boundaries of the existing Potrero Power Plant south of the San Francisco central business district. The project is proposed to be constructed on about 6.5 acres in the south-central portion of the existing 20 acre site. Natural gas would be supplied via an existing gas supply pipeline. The project would also include construction of a new 115-kV switchyard located at the west end of the property between the existing Pacific Gas and Electric (PG&E) substation and proposed

Unit 7. A direct interconnection would be made to PG&E's Potrero Substation. A separate underground connection would be made to PG&E's Hunters Point Substation located about 1.8 miles to the south of the Potrero Power Plant. The interconnection between the Potrero Plant switchyard and the Hunters Point substation will consist of two 115 kV circuits that will be installed in twin parallel underground conduits. The underground cable would be routed under city streets and cross under the Islais Creek channel.

As part of developing the circulating cooling water supply for the proposed project, the cooling water intake for Potrero Unit 3, an existing unit, would be replaced and combined with a new intake for Unit 7. The new intake structure would be located south of the existing Unit 3 discharge. Two new cooling water discharge systems, with diffusers, would be constructed to serve both the new unit 7 and existing unit 3.

### **Existing Structures**

The portion of the Potrero Power Plant site proposed for construction is occupied by a group of abandoned structures known as the Station A complex, which was built about 1910, decommissioned in 1979, and partially demolished in 1981. Remaining structures include the turbine hall portion of the main powerhouse, gate house, meter building, compressor building, and pump house. These structures are seismically unstable and, since Mirant has no plans for their future use, are scheduled for demolition and removal during the first three months of the Unit 7 project. In addition, a prefabricated metal shop building located west of the meter house and compressor building will be dismantled and relocated offsite.

### **On-Shore Characterization**

The site has a history of industrial activity dating from at least 1870, including operation of manufactured gas plants, barrel manufacturing, sugar refining, and power generation. PG&E became the owner of the property in 1911. Southern Energy of California (now Mirant Corporation) recently purchased the Potrero site from PG&E, but under contractual terms, PG&E retains responsibility for cleaning up onsite contamination created prior to the sale.

As the previous owner of the site, PG&E has sponsored several site investigations to determine the nature and extent of any soil or groundwater contamination. These include a Preliminary Endangerment Assessment, Phase I and II Environmental Site Assessments (ESAs), and a Report of Results of Additional Site Characterization.

### **Phase I ESA**

The Phase I ESA was done in October, 1997 in accordance with American Society for Testing and Materials Standard E 1527-94, Standard Practice for Environmental Site Assessments (SECAL 2000a, AFC Appendix M). The purpose of an ESA is to determine the potential for the presence or likely presence of any hazardous substances or petroleum products under conditions that may indicate a release or threat of a release from present or past activities. No soil or groundwater samples were collected during the Phase I ESA.

The activities that were conducted as part of the Phase I ESA consisted of the following:



- A records review of the site and adjoining and surrounding properties, including PG&E permits, programs, plans, and internal correspondence; federal, state, regional, and local regulatory agency databases; and regulatory agency files for the plant and sites requiring further investigation;
- A site walkthrough that included visual observations of the site and its facilities and improvements; and visual observations of adjoining properties, including an assessment of the use, storage, and disposal of hazardous materials and hazardous wastes; and
- Interviews with people familiar with the site and past and present operations, including plant staff and regulatory officials from Region IX of the U.S. EPA, DTSC, the San Francisco Bay Regional Water Quality Control Board (SFBRWQCB), and the City and County of San Francisco Department of Public Health (SFDPH).

The Phase I ESA identified several issues of environmental concern, both sitewide and site-specific. Sitewide issues included contamination of soils and groundwater by various organic constituents and heavy metals, tank and drum storage on unpaved areas, unknown constituents in the artificial fill in the eastern part of the site, and a possible 1988 asbestos release. Site-specific issues included possible hydrocarbon spills associated with underground and aboveground storage tanks and/or piping, excavated soils, and contents of former plant buildings.

## **Phase II ESA**

A Phase II ESA was conducted in June, 1998, prior to the sale of the property (Fluor Daniel 1998). It included the collection of subsurface soil and groundwater data in response to issues identified in the Phase I ESA.

The following summarizes the analytical results for the Phase II soil sampling data:

- Total petroleum hydrocarbons (TPH) were found in near-surface and subsurface soils and in the upper saturated zone. Sixteen areas across the site had concentrations greater than 1,000 mg/kg, with six of these located within the area of planned excavation. The highest concentration was found in the northeast corner of the site, outside of the construction area.
- Total polynuclear aromatic hydrocarbons (PAHs) exceeding 100 mg/kg were found in near- and subsurface soils to depths to 40 feet. With two exceptions, the maximum concentrations for individual PAHs were located at depths of at least 24 feet. Only five samples with individual PAH concentrations exceeding 100 mg/kg were located at depths less than 13 feet. Within the proposed excavation footprint, two PAHs with concentrations as high as 250 mg/kg at three feet and 47 mg/kg at nine feet were found.
- Three metals were found at levels exceeding regulatory limits for hazardous waste: copper in one boring, lead in three borings, and nickel in one boring. Within the proposed excavation footprint, nickel and lead were found in excess of regulatory limits, and chromium at slightly more than one-half the limit was found.
- Volatile organic compounds (VOCs) were detected mostly in samples from the northeastern portion of the site at depths greater than 20 feet. Within the proposed

excavation footprint, benzene was found at a depth of nine feet, while toluene, ethylbenzene and total xylenes were found in a surface sample.

- Cyanide was detected at various depths and locations across the site, with the southwest portion of the site appearing to be the most impacted area.
- Polychlorinated biphenyls were detected in 10 of 99 samples analyzed. All detections were from samples from the eastern portion of the property.
- Three phenolic compounds were detected in soil, however, none were found in samples collected from the proposed excavation footprint.
- Naturally occurring asbestos from serpentine bedrock was found at concentrations greater than one percent (the regulatory level defining hazardous waste) in samples from 15 locations at depths of less than 13 feet. Two surface samples from the excavation footprint contained asbestos at two percent, and one sample contained three percent.

The following summarizes the analytical results for the Phase II groundwater sampling data (a discussion of groundwater data may be found in the Soil and Water Resources section of the staff assessment):

- Total petroleum hydrocarbons were found in groundwater at relatively low concentrations throughout the entire site. However, concentrations exceeding 10 mg/L were found in wells in the northeastern and southeastern portions of the site.
- A total of 16 PAHs were detected across the site. The highest concentrations of eight of these were found in a well along the eastern edge of the site, while three others were from a well associated with the northeastern dense non-aqueous phase liquid (DNAPL) pool. These results may not be indicative of dissolved phase concentrations, but may reflect small amounts of entrained separate phase material in the groundwater sample.
- Metals were detected at low concentrations in samples collected from across the site. Barium, chromium, lead, mercury, and selenium were detected at concentrations exceeding regulatory thresholds for hazardous waste classification in at least one well.
- Volatile organic compounds were present in groundwater in areas related to the impacted soil.
- The highest concentration of total cyanide in groundwater was found in the sample collected from the western edge of the property.
- No polychlorinated biphenyls were detected at a level greater than the method detection limit.

Chemicals were also detected in non-aqueous layers, including light- and dense non-aqueous phase liquids (LNAPL and DNAPL, respectively). LNAPL, which was found floating above groundwater in one of the monitoring wells in the northeast portion of the site, contained TPH at a concentration of 675,000 mg/kg and relatively low concentrations of PAHs. DNAPL at the bottom of two monitoring wells in the eastern and northeastern portion of the site was measured at 6.3 and 7.5 feet in thickness. The samples contained 520,000 and 5,810 mg/kg of TPH, respectively. PAH concentrations

found in the sample from the monitoring well in the eastern portion of the site were 54,000 mg/kg for acenaphthene and 51,000 mg/kg for naphthalene.

### **Additional Site Assessment**

Following the Phase II ESA, an additional site assessment was performed to address data gaps from the previous investigations (Geomatrix 2000). The additional investigation obtained information regarding:

- the extent and magnitude of cyanide in groundwater across the site,
- the extent and magnitude of TPH and PAHs in the southwestern area of the site (the area of the proposed Unit 7), and
- the extent and characteristics of DNAPL in the northeastern and eastern areas of the site.

Field activities conducted as part of the additional site assessment included installation of groundwater monitoring wells, collection of groundwater samples, collection of DNAPL samples for chemical analyses, and measurement of DNAPL and LNAPL depth and thickness.

The following summarizes the distribution of chemicals in groundwater:

- Concentrations of cyanide in the southwestern area were low to non-detect. Cyanide was not detected in samples from existing wells located within the proposed excavation areas.
- Concentrations of TPH in samples collected from wells within the southwestern area of the site were less than one mg/l, with the exception of one sample that contained 3.7 mg/l of TPH quantified as crude oil. A sample from a well located in the southern portion of the proposed excavation of unit 7 was not analyzed due to the presence of an LNAPL sheen. Samples collected from the easternmost shoreline wells in the vicinity of the excavation footprint ranged from non-detect to 1.1 mg/L. Concentrations of TPH in groundwater samples collected from wells in the northeastern corner of the site, outside of the excavation footprint, were as high as 6.5 mg/L.
- Benzene was not detected in three of four wells sampled within the vicinity of the excavation footprint, but was detected at concentrations as high as 3.9 mg/L in wells significantly outside of the excavation footprint.
- Concentrations of PAHs in the southwest area of the site ranged from non-detect to less than 0.050 mg/L. Naphthalene was detected at concentrations of less than or equal to 0.11 mg/L in wells located within the vicinity of the excavation footprint and as high as 8.4 mg/L in wells significantly outside the excavation footprint in the northeastern area.

The following summarizes the distribution of chemicals in non-aqueous layers:

- LNAPLs were detected in two monitoring wells in the northeastern portion of the site (outside of the excavation footprint) at thicknesses of 0.85 foot and 0.1 foot, respectively.

- Thickness of DNAPL in the northeastern area ranged from approximately three to six feet, at depths of about 20 feet below ground surface (bgs). In the eastern area of the site, in the vicinity of the excavation footprint, DNAPL thickness ranged from about 3 to 14 feet, at a depth of about 35 feet bgs. Samples of DNAPL from the northeastern and eastern areas contained TPH at concentrations as high as 51 and 100 percent. Benzene concentrations ranged from 0.2 to 0.51 percent. Naphthalene was detected at concentrations ranging from 5.5 to 5.8 percent. Leachability analyses indicated that the DNAPL has the potential to leach dissolved constituents.

## **Off-Shore (Sediment) Characterization**

### **July 2000**

Mirant conducted sediment sampling at 12 offshore locations in July 2000 (SECAL2000Seds1). The purpose was to obtain initial sediment quality data in areas where dredging may be needed during construction of the proposed cooling water intake and discharge structures. The sampling locations were located 50 to 250 feet offshore along five shore-perpendicular transects. Sediment cores up to 12 feet in length were collected and subsampled at approximately three-foot intervals. The samples were analyzed for a variety of parameters, including total solids, total organic carbon, metals, TPH, PAHs, pesticides, and PCBs. Some samples were tested for cyanide, VOCs, and semivolatile organic compounds.

Sampling results showed that high PAH concentrations were detected at three nearshore locations, with PAH concentrations generally increasing with depth. Lower levels of PAHs, VOCs and other compounds were detected at other locations. Metal and PCB/pesticide concentrations were found to be on the same order as background concentrations. Sediment layers containing oily black fluids were observed in the nearshore cores. Two primary areas were identified that were impacted by contamination: one offshore of the northeastern corner of the site, just north of the existing Unit 3 intake structure, and one offshore of the southern-central portion of the shoreline, near the existing Unit 3 outfall.

### **January 2001**

A second sediment sampling effort took place during the week of January 15, 2001. The purpose of the additional sampling was to characterize the horizontal and vertical extent of contamination in nearshore sediments along the Potrero waterfront and to delineate offshore areas that have not been impacted. The data were collected to evaluate whether the locations of the proposed Unit 3 and Unit 7 intake and discharge structures could be adjusted to reduce the disturbance of contaminated sediments.

A total of 19 additional sampling locations were included, with 13 of the locations focusing on PAH analysis, and six locations including the complete analyses referred to above. In general, the results of the subsequent sampling were consistent with the initial findings reported above. The highest PAH concentrations were detected in samples from nearshore cores located off the northeastern corner of the site. The concentrations generally increased with depth, and the cores with the lowest concentrations were those located farthest offshore. The highest concentrations of total

PAHs in surface sediments were in the region of the Unit 3 outfall. The PAH sediment concentrations also decrease towards the south of the site. Benzo(a)pyrene and TPH sample results showed similar patterns to the PAH results. Metal and PCB/pesticide concentrations were on the same order as background concentrations.

## IMPACTS

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### PROJECT SPECIFIC IMPACTS

#### Site Preparation

Hazardous and nonhazardous wastes will be generated by the demolition of buildings during site preparation as well as the excavation of contaminated on-shore soils and off-shore sediments.

#### **Building Demolition**

Site preparation will include the removal of the structures described in the **Project and Site Description** discussion above. Prior to demolition, the buildings will undergo a Hazardous Materials Abatement by a licensed contractor (SECAL 2001a, AFC Amendment p. 2-26). Confirmation of the removal of hazardous materials will be made via a walk-through inspection prior to demolition. Staff's proposed Condition of Certification **WASTE-7** requires the project owner to confirm such removal. Hazardous wastes expected to be generated from the abatement process include 1,120 cubic yards of asbestos, 30 drums of lead, 10 drums of polychlorinated biphenyl ballasts, 40,000 linear feet of fluorescent lights, and 550 gallons of miscellaneous wastes (SEP 2000a, response to staff data request 140, Table 140-1). These wastes will be transported to hazardous materials disposal sites listed in Application for Certification Station A Amendment Table 141-1 (SEP 2000a, response to staff data request 141).

Nonhazardous wastes generated from the demolition of station A structures include an estimated 6,000-8,000 yd<sup>3</sup> of concrete debris, 8,000-10,000 yd<sup>3</sup> of brick debris, and 400-500 tons of scrap metal (SECAL 2001a, AFC Amendment table 2.8, p. 2-51). All metals would be transported to a recycling facility in Oakland (SECAL 2001a, AFC Amendment p. 2-26). The brick debris would either be crushed onsite for recycling as fill material, or transported to a recycling plant in Half Moon Bay (Id.). Concrete may be crushed and recycled onsite depending on the need for fill material and the composition of the concrete. Remaining concrete debris would be transported to a concrete recycling plant located near the Hunters Point Power Plant (Id.).

#### **On-Shore Activities**

As noted above, PG&E is responsible for remediating contamination created prior to Mirant's purchase of the property. Due to PG&E's bankruptcy, however, the issue of their ability to continue remediation activities has been raised by various parties. PG&E has issued a letter stating that they have obtained an order from the United States Bankruptcy Court for the Northern District of California allowing them to continue certain hazardous substance remediation programs and procedures (PG&E 2001a). PG&E

states that they will be continuing with the performance of their remediation obligations under applicable law.

PG&E has requested the Site Designation Committee within the California Environmental Protection Agency to designate the San Francisco Regional Water Quality Control Board (SFRWQCB) as the lead agency in overseeing site cleanup. The purpose of the Site Designation process is to allow a Responsible Party who agrees to carry out a site investigation and remedial action to request the designation of a single state or local agency to oversee the site investigation and remedial action. On March 29, the Committee approved PG&E's request and designated the SFRWQCB the lead agency for the site.

PG&E plans to coordinate its final Remedial Action Plan (RAP) with the Site Mitigation and Implementation Plan (SMIP) prepared by Mirant (SECAL 2000a, AFC Appendix D2) and further agrees to implement the SMIP as provided for in the Purchase and Sale Agreement as part of the construction program for Unit 7 (SECAL 2000a, AFC Appendix D1).

The SMIP provides a description of the general site conditions; environmental investigations conducted at the site, estimates of expected soil and groundwater volumes to be generated during construction; excavation and material handling and disposal procedures; and additional soil and groundwater sampling requirements.

The main mitigation objectives of the SMIP include:

- Management and proper onsite reuse and/or disposal of excavated soil/rock;
- Management and proper handling and/or disposal of groundwater generated during construction;
- Management and appropriate reuse and/or disposal of sediments excavated during construction;
- Implementation of construction so as to minimize adverse impacts to human health, safety, and the environment; and
- Implementation of site mitigation consistent with the RAP to the maximum extent feasible.

Sampling results for material to be excavated during project construction were preliminarily compared with California hazardous waste criteria and asbestos containing material greater than one percent. Based on the concentrations of metals in soil as indicated from existing analytical data, all soil to be excavated would potentially be considered hazardous waste if disposed offsite. All hazardous designations are preliminary and will require additional field sampling for confirmation and profiling. Additional sampling including leachate procedures may determine that some soils are nonhazardous. The actual volume of soil that will be reused or disposed is unknown until testing is accomplished, but initial estimates are presented in Table 13 of the SMIP. The total volume of material to be excavated is estimated to be about 37,000 cubic yards, excluding amounts for the intake structure.

Soil chemical data from the site investigations were examined and used to develop likely management and disposal requirements. Analytical results for soil borings within the footprint of the proposed excavations were compared to the following criteria: (1) Ten times the Soluble Threshold Limit Concentrations for metals in Title 22 of the California Code of Regulations, (2) U.S. EPA Region IX 1999 Preliminary Remediation Goals (PRGs) for PAHs in industrial soils, and (3) 1,000 mg/kg concentration for TPH.

Concentrations of nickel, chromium, and lead were found in excess of regulatory levels at all depths throughout the excavation footprints. These three metals will drive the classification of excavated material for the purposes of disposal. However, an additional criterion for disposal of excess soil will be California Health and Safety Code section 25157.8 which contains requirements for handling soil containing total levels of lead above 350 mg/kg, copper in excess of 2500 mg/kg, and nickel in excess of 2000 mg/kg. Multiple PAHs at concentrations above the Region IX PRG limits for industrial soils were found. Most landfills will accept soils containing PAHs and petroleum hydrocarbons at the concentrations found. Only one surface soil sample located within the 23rd street conduit excavation footprint contained PCBs above the industrial PRG. There were no soils containing phenolics in any of the samples from the excavation footprint area. No VOCs at concentrations in excess of the industrial soils PRG were found in soil samples within the area to be excavated. Naturally occurring asbestos containing materials were found in three surface samples where the concentration exceeded one percent.

Based on their discussions with the San Francisco Department of Public Health, Mirant prepared a supplement to the SMIP (MIRANT2001DResCCSF, Data Response No. 6,7, Attachment 6-1). The supplement included a scope of work designed to characterize excavation materials for the possible reuse or offsite disposal at an appropriate landfill facility. Mirant proposes to perform the following tasks prior to handling, reuse, and disposal of material:

- Task 1 – Prepare a soil sampling and analysis plan, as required under the Maher Ordinance, for review and approval.
- Task 2 – Collect supplemental soil analytical data in specific areas where soil will be excavated, including the proposed conduit, power block, and cooling water intake structure areas.
- Task 3 – Prepare a Soils Analysis Report to summarize the results of the sampling data. The SMIP will detail how material will be managed and handled after excavation, and specify performance criteria for the reuse of excavated material. In addition, maps and cross-sectional schematics indicating where and how soils will be stockpiled will be submitted prior to the start of construction (Mirant2001DResCCSF(2A), Data response no. 6).

Staff's proposed Condition of Certification **WASTE-6** requires Mirant to submit a final SMIP prior to construction.

Excavated material will be stockpiled on site, sampled, and analyzed to determine future reuse or offsite disposal options. The proposed stockpile area will be within the construction laydown area. Soil which is known to contain hazardous levels of a

chemical should be segregated from other soil containing hazardous levels of another chemical and from nonhazardous or uncharacterized soil. The stockpile areas will be bermed and lined to reduce the potential for migration of contaminated material. The stockpile area will be covered with a 10 to 15 mil thick plastic liner which will extend to a berm which will be created around the perimeter with either clean soil or hay bales. The surface of the stockpile will be sprayed with water to minimize the potential for fugitive dust emissions. If required for odor or dust control, the stockpile will remain covered and only the working face will be exposed when material needs to be added or removed. At the end of each day, the stockpile will be covered with plastic sheeting held in place with sandbags (Mirant2001DResCCSF, Data Response No. 8).

In comments to staff (DTSC2001PSAComm, p. 2), DTSC noted that construction drawings should indicate the location of the construction contractor's hazardous waste storage area and that the portion of the storage area where excess fill material would be stored must meet the requirements for waste pile storage outlined in Health and Safety Code Chapter 6.5 and Cal. Code of Regs. Title 22, section 66264.250. Staff's proposed Condition of Certification **WASTE-8** requires the project owner to provide completed construction drawings showing the storage area location and how it would comply with regulatory requirements.

### Off-Shore Activities

As a result of the further sediment characterization studies performed in January, 2001, Mirant chose a location for the combined units 3 and 7 cooling water intake structure approximately 250 feet south of their original proposed location, to a position south of the existing unit 3 discharge (Mirant2001g, p.1.). Relocating the structure would reduce the disturbance and exposure to subsurface contaminated sediments. About 4,050 cubic yards from an area in front of the intake structure would have to be dredged (Mirant 2001h, p. 2). Construction of the intake structure would occur inside a cofferdam that would be enclosed in a silt curtain designed to prevent the movement, migration, or resuspension of hazardous materials. Dredged material would be transferred to land and disposed at the Altamont Landfill and Resource Recovery Facility in Livermore. Bay Area Conservation and Development Commission (BCDC) staff have concluded that because the dredged materials would be deposited at an upland facility, the Dredged Materials Management Office (DMMO) may not require more testing (BCDC2001, p. 17). BCDC staff have also recommended that the BCDC Commission find that the project, as proposed and as modified by the conditions contained in the staff report, would be consistent with its policies on dredging (Id).

The location of the outlet structures for the Units 3 and 7 cooling water discharge pipes will be maintained, but the location and configuration of the pipes and diffuser structures will be modified to minimize contact with contaminated sediment. The pipe material will be high density polyethylene (HDPE) that will be placed on the surface of the sediment to minimize dredging (Mirant2001DMMO). The reduced dredge volume resulting from this design is minimal compared to the original concrete pipe design which would have required 40,000 cubic yards of dredging. The two pipes for each unit will be placed in parallel for the first 300 feet to minimize their footprint. A soil stabilization fabric will be placed directly over the sediment. The pipes will then be laid and surrounded by gravel fill. A marine mattress will be used as a cover, and riprap placed on top. Although the



discharge pipes would be located in areas of least contamination, the method of their construction serves as an engineered cap to prevent migration of contaminated sediments.

In comments to staff (DTSC2001PSAComm, p. 1), DTSC stated that their concerns regarding the potential for dredging to expose sediments containing higher concentrations are addressed by (1) the proposed relocation of the intake structure; (2) modification of the diffuser pipelines so that they will only require limited dredging by the shoreline; (3) management of the dredging activities within a coffer dam; (4) capping all dredged areas with either structures or an engineered cap; and (5) review and approval of the dredging activities by the Dredged Material Management Office.

## **Construction**

Nonhazardous and hazardous wastes will also be generated during construction of the proposed facility.

A variety of nonhazardous waste streams will be generated from construction of the generating plant and ancillary equipment. Paper, wood, glass, and plastics will be generated from packing materials, waste lumber, insulation, and empty chemical containers. The applicant estimates that about 150 tons of these wastes will be generated (SECAL 2000a, AFC p. 8.13-2), and those which cannot be recycled will be disposed of in a Class III landfill. The applicant also expects that about 100 tons of excess concrete will be generated during the course of construction (SECAL 2000a, AFC p. 8.13-3). The applicant proposes to use as much of the waste concrete as possible to fill protective pipe bollards, to precast small slab or retaining wall section, or to place nonstructural features such as sidewalks, steps, etc. The remaining scrap concrete will be buried onsite or disposed of in a Class III landfill (Id.). In addition, metal wastes will be generated from welding/cutting operations, packing materials, empty chemical containers, and wiring. About 50 tons of metal wastes are expected, and that which cannot be recycled will be deposited in a Class III landfill (Id.).

Hazardous wastes that may be generated during facility construction include waste oil and grease, paint, spent solvents, welding materials, and cleanup materials from spills of hazardous substances. AFC Table 8.13-3 presents the types and quantities of hazardous wastes that are anticipated to be generated during construction. The quantities of solid hazardous wastes are expected to be relatively minor, as is typical for this type of project. Most of the liquid hazardous wastes would be recycled.

The construction contractor is considered the actual waste generator and will be responsible for proper hazardous waste handling. Such wastes will be collected in hazardous waste accumulation containers near the point of generation. The containers will be taken to the construction contractor's hazardous waste storage area and within 90 days will be delivered to an authorized hazardous waste management facility (SECAL 2000a, AFC p. 8.13-4).

BCDC staff recommended a Condition of Certification requiring all construction debris be removed to a location outside the jurisdiction of the BCDC, and that in the event any such material is placed in any area within BCDC's jurisdiction, it be removed within ten

days (BCDC2001, p. 19). Staff's proposed Condition of Certification **WASTE-10** satisfies this requirement.

Part of the proposed Unit 7 project consists of an interconnection to PG&E's Hunters Point Substation via two 115-kV underground transmission cables that must be constructed. The cables will be buried in a trench that follows secondary city streets within existing street rights-of-way and also within an abandoned railroad right-of-way. The total length of the route is approximately 9,400 feet. The route is proposed to cross Islais Creek Channel south of the Potrero PP and east of the Third Street bridge.

AFC Table 2-18 presents estimated amounts of transmission line construction debris for each segment of the trench. As excavation proceeds, clean soil will be stockpiled adjacent to the trench. Street surfacing will be removed and disposed of. Directional boring would be used for cable installation under Islais Creek. To facilitate the boring (i.e., power the cutting head, stabilize the hole against collapse, and provide a transport medium for cuttings), bentonite clay would be used. This is a naturally occurring clay with hydrophilic properties. At the completion of the bore, the bentonite slurry would be dewatered and recycled for use in other projects. However, it should only be reused if data is available demonstrating that the material coming into contact with the bentonite is clean (see Condition of Certification **WASTE- 11**).

### **Operation**

Under normal operating conditions, the proposed facility will generate both nonhazardous and hazardous wastes.

Nonhazardous wastes generated during plant operation include solid wastes such as trash, office wastes, empty containers, broken or used parts, used packing material, and used filters. Mirant has estimated annual quantities and proposed management methods for nonhazardous wastes generated from routine operation of Unit 7 (SEP 2000a, Table 142-1, response to staff data request 142).

Demineralized water is presently supplied to the Potrero Power Plant from a mobile trailer-mounted water treatment system, which is supplied by a vendor. Regeneration of the catalyst beds and other maintenance cycles are performed offsite by the vendor, who is responsible for the disposal of all waste streams that result from operation of the units (SECAL 2000a, AFC p. 2-9).

Hazardous wastes likely to be generated during routine project operation include spent air pollution control catalysts, used oil and filters, used cleaning solvents, waste paint, sandblast media, compressor washwater, and contaminated cleanup materials. The types and quantities of hazardous wastes expected to be generated, along with their management methods, are shown in AFC Table 8.13-3. About 90 tons of solid hazardous waste would be generated annually, with between 70 and 95 percent expected to be recycled (SECAL 2000a, AFC p. 8.13-5). The maximum volumes of hazardous wastes that are estimated to be accumulated onsite is listed in Table 126-1 of the Responses to SAEJ data requests (Mirant2001DResSAEJ, Data Response No. 126).

There is an existing hazardous waste storage building located on the northeast corner of the plant property near the Unit 3 intake and storm drain 4. The building typically

contains sealed containers with wastes segregated by type, such as oily liquid, oily solids, asbestos, used batteries, and fluorescent and halogen lamps. This facility is on an impermeable and bermed, paved surface. The building and hazardous waste storage areas are inspected weekly.

## **IMPACT ON EXISTING WASTE DISPOSAL FACILITIES**

Nonhazardous waste which is not recycled will be disposed of at one of the regional Class III landfills in the area. AFC Table 8.13-1 lists landfills and recycling facilities in the vicinity of the Unit 7 project. Each of the facilities listed have large operating and permitted capacities relative to the quantities of waste expected from project operation. Even discounting the effects of recycling on the total amount of non-hazardous wastes destined for landfilling, the amount of waste generated during project construction and operation are insignificant relative to existing disposal capacity.

Three Class I landfills in California, at Kettleman Hills in King's County, Buttonwillow in Kern County, and Westmoreland in Imperial County, are permitted to accept hazardous waste. There is a combined total in excess of twenty million cubic yards of remaining hazardous waste disposal capacity at these facilities with remaining lifetimes as long as 50 years. Also, the amount of hazardous waste being transported to these landfills has decreased in recent years due to source reduction efforts by generators, and the transport of waste out of state that is hazardous under California law, but not federal law.

Much of the hazardous waste generated during facility construction and operation will be recycled, such as used oil and spent catalysts. Even without recycling, the generation of hazardous waste from Unit 7 would comprise only a small fraction of existing capacity (less than one percent), and not significantly impact the capacity of any of the state's Class I landfills.

## **CUMULATIVE IMPACTS**

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Due to the minor amounts of wastes generated during project construction and operation, the insignificant impacts on individual disposal facilities, and the availability of additional regional landfills, cumulative impacts will be insignificant for both hazardous and nonhazardous wastes.

## **FACILITY CLOSURE**

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During any type of facility closure (see staff's **General Conditions** section which discusses planned, unexpected temporary, and unexpected permanent closure), the primary waste management related concern is that project wastes not pose any potentially significant problem to the public, workers, or the environment. Staff has determined that conditions of certification in the **General Conditions** section will adequately address waste management issues related to closure.

In the case of unexpected temporary closure, waste management practices normally required by LORS and already in-place (such as limiting hazardous waste accumulation time to 90 days and requiring proper containment) would likely be adequate to avoid

significant problems. In addition, staff's General Conditions for Facility Closure require preparation of an on-site contingency plan which shall provide for removal of hazardous wastes and draining of all chemicals from storage tanks and other equipment for temporary closures exceeding 90 days.

An approved on-site contingency plan is also required to protect public health and safety in the case of unexpected permanent closure. As above, the plan must provide for the removal of hazardous materials and hazardous wastes, draining of all chemicals from storage tanks and other equipment, and the safe shutdown of all equipment.

For planned permanent closure, Mirant is required to develop a facility closure plan at least twelve months prior to commencement of closure and is committed to complying with LORS which are applicable at the time of closure (SECAL 2000a, AFC p. 8.13-11).

## **RESPONSE TO PUBLIC AND AGENCY COMMENTS ON THE PSA**

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### **CITY AND COUNTY OF SAN FRANCISCO**

**CCSF-4F:** *"The issue of sediment contamination is not adequately addressed in the PSA, and it draws no conclusions regarding potential impacts, pending additional sediment sampling."*

**Response:** Mirant submitted results of additional sediment sampling performed in July, 2001, which is discussed in the **Offshore Sediment Characterization** section above. Based on results of that sampling, Mirant modified the location of the intake and discharge structures to minimize disturbance of contaminated sediments, as discussed in the section **Project Specific Impacts - Offshore Activities**.

**CCSF-14:** *"The Regional Water Quality Control Board's requirements and schedule for remediation should be incorporated into the PSA. The Applicant should coordinate the proposed project construction with ongoing and planned remediation of the project site."*

**Response:** PG&E plans to coordinate its clean up activities with Mirant and implement the Site Mitigation and Implementation Plan as noted in the section **Project Specific Impacts - On Shore Activities**.

### **DEPARTMENT OF TOXIC SUBSTANCES CONTROL**

**DTSC-1:** *"The location of the intake structure and diffuser pipelines have been modified and the amount of dredging proposed has been greatly reduced. Our concerns regarding the potential for dredging to expose sediments containing higher concentrations are addressed by..."*

**Response:** Comment noted in the section **Project Specific Impacts – Offshore Activities**.

**DTSC-3:** *"The Site Mitigation and Implementation Plan should be revised to clarify the steps which will be taken to ensure that grading and/or other soil movement activities will not exacerbate existing conditions or increase the potential for chemicals to impact*

*site workers and/or the groundwater. The Plan should include the amount of excess fill material which will be generated and the decision criteria for determining which soil is disposed of offsite.”*

**Response:** Please see the section **Project Specific Impacts - On Shore Activities** for a description of the SMIP components and proposed Condition of Certification **WASTE-6**.

**DTSC-4:** *“The contaminant mitigation plan addresses hazardous substances which must be abated in the buildings proposed for demolition. It may be more clear to add a condition of certification requiring a submittal of implementation report(s) documenting completion of hazardous substance removal activities prior to demolition of these buildings.”*

**Response:** Staff has proposed Condition of Certification **WASTE-7** that requires hazardous substances be removed prior to demolition.

**DTSC-5:** *“Construction drawings should indicate the location of the construction contractor’s hazardous waste storage area. The portion of the storage area where excess fill material will be stored must meet the requirements for waste pile storage outlined in Health and Safety Code Chapter 6.5 and in Title 22. If the soil meets the definition of a hazardous waste and the storage area is not located on the PG&E Potrero Site, requirements for transportation of hazardous waste must be complied with or a variance from these requirements should be obtained prior to implementation.”*

**Response:** Staff’s proposed Condition of Certification **WASTE-8** requires the project owner to submit information describing the waste storage area.

**DTSC-6:** *“Due to PG&E’s bankruptcy, it is unclear whether they will be able to fulfill the responsibilities outlined in the PSA. DTSC recommends that the FSA contain a requirement that the project owner be responsible for ensuring that these activities are completed, whether by PG&E or themselves.”*

**Response:** As noted in the **Project Specific Impacts – On Shore Activities** section, PG&E has obtained an order from the United States Bankruptcy Court for the Northern District of California allowing it to continue certain hazardous substance remediation programs and procedures and that it will be continuing with the performance of its remediation obligations under applicable law. However, to be sure that project-related remediation proceeds regardless of future circumstances, staff’s proposed Condition of Certification **WASTE-9** requires the project owner to ensure that such activities are completed.

**DTSC-8:** *“An additional criterion for disposal of excess soil will be California Health and Safety Code section 25157.8 which contains requirements for handling soil containing total levels of lead above 350 mg/kg, copper in excess of 2500 mg/kg, and nickel in excess of 2000 mg/kg.”*

**Response:** Comment noted in the section **Project Specific Impacts - On Shore Activities**.

**DTSC-8:** *“Soil which is known to contain hazardous levels of a chemical should be segregated from other soil containing hazardous levels of another chemical and from nonhazardous or uncharacterized soil.”*

**Response:** Comment noted in the section **Project Specific Impacts - On Shore Activities**.

**DTSC-9:** *“The construction contractor, although typically not the generator, is responsible for management of the hazardous waste it generates. DTSC is not evaluating the determinations made regarding the classification of waste streams presented in the PSA.”*

**Response:** comment noted.

**DTSC-9:** *“It is our understanding that the trench excavation and boring under Islais Creek is not part of the project. If this is correct, the text and conditions should be revised to reflect this. The bentonite slurry should not be reused unless data is available demonstrating that the material coming into contact with the bentonite would be clean.”*

**Response:** The excavation and boring referred to is for placement of the underground transmission cable between the Potrero Plant switchyard and the Hunters Point substation. That remains part of the project being considered in this FSA.

**DTSC-10:** *“DTSC was going to suggest that financial assurance for closure be required to ensure that the activities outlined in this section can take place. However, CEC staff have already evaluated this and have indicated that this would be addressed in the on-site contingency plan for unexpected facility closure.”*

**Response:** comment noted.

**DTSC-11:** *“If currently unknown areas of soil discoloration, odor, or other indicators of contamination are uncovered, work should halt unless strict criteria are in place for addressing this contamination. The RWQCB, as designated lead agency for the site, should be notified within 24 hours if unknown contamination is uncovered. A licensed California professional engineer/registered geologist with experience in hazardous substance release site characterization and cleanup should then work with the RWQCB to conduct sampling and remediation activities.”*

**Response:** Staff's proposed Conditions of Certification **WASTE-4** and **-5** require a Registered Professional Engineer or Geologist, with experience in remedial investigation and feasibility studies, to oversee activities in the event unknown contamination is encountered. The requirement to contact the Regional Water Quality Control Board has been added to Condition of Certification **WASTE-5**.

**DTSC-14:** *“Condition WASTE-5 should be revised to require that the RWQCB be contacted in the event currently unknown contamination is identified.”*

**Response:** Please see response to **DTSC-11**.

## SAN FRANCISCO BAYKEEPER

**SFBK-1B:** *“Neither staff nor the applicant has not (sic) completed an evaluation of ecological risk posed by disturbing contaminated sediments resulting from dredging.”*

**Response:** The intake and discharge structures have been moved to new locations that are less impacted by contamination. In addition, construction of the intake structure will take place within a silt curtain and cofferdam, and the design of the discharge pipes has been modified to require less dredging and provide a cap over the sediment.

## SAN FRANCISCO BAY CONSERVATION AND DEVELOPMENT COMMISSION

**BCDC-7:** *“Because the applicant proposes to dispose the dredged material at an upland landfill, the San Francisco Bay Plan dredging policies regarding disposal do not apply to this project.”*

**Response:** Comment noted.

## CALIFORNIA DEPARTMENT OF FISH AND GAME

**CDFG-2:** *“The Department understands that the applicant is working with the Dredged Materials Management Office to adequately characterize the sediments and determine their suitability for various disposal options. The Final Staff Assessment should incorporate the results of the sediment testing.”*

**Response:** Additional sediment test results is summarized in the section **Off-Shore (Sediment) Characterization**. The sediments will be disposed at the Altamont Landfill and Resource Recovery Facility in Livermore.

**CDFG-3:** *“The PSA does not address whether maintenance dredging will be required to maintain the depth of the area in front of the intake or whether any scouring will occur at the mouth of the intake.”*

**Response:** No maintenance dredging is proposed and none has been needed at the existing Unit 3 intake structure.

## ENVIRONMENTAL JUSTICE

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Staff has reviewed Census 2000 information that shows the minority population is greater than fifty percent within a six-mile radius of the proposed Potrero Power Plant Unit 7 Project (please refer to Socioeconomics Figure 1 in this Staff Analysis), and Census 1990 information that shows the low-income population is less than fifty percent within the same radius. Based on the waste management analysis, staff has not identified unmitigated significant direct or cumulative impacts resulting from the construction or operation of the project, and therefore there are no waste management-related environmental justice issues related to this project.

## **COMPLIANCE WITH APPLICABLE LAWS, ORDINANCES, REGULATIONS, AND STANDARDS (LORS)**

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Energy Commission staff concludes that the Unit 7 project will be able to comply with all applicable LORS regulating the management of hazardous and non-hazardous wastes during project operation. The applicant is required to dispose of hazardous and non-hazardous wastes at facilities approved by the San Francisco Bay Regional Water Quality Control Board or the Cal EPA - Department of Toxic Substances Control. Because hazardous wastes will be produced during project construction and operation, Mirant must acquire and maintain an identification number as a hazardous waste generator. Accordingly, Mirant will be required to properly store, package and label waste, use only approved transporters, prepare hazardous waste manifests, and keep detailed records. Pursuant to California Code of Regulations, title 22, section 67100.1 et seq., a hazardous waste source reduction and management review may be required, depending on the amounts of hazardous waste ultimately generated.

## **MITIGATION**

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Mirant intends to implement the following mitigation measures during construction and operation of the proposed Unit 7 project ( AFC p. 8.13-11):

- Employees will be trained in hazardous waste procedures, spill contingencies, and waste minimization.
- Procedures will be developed to reduce the quantity of hazardous wastes generated. Nonhazardous materials will be used instead of hazardous materials whenever possible, and wastes will be recycled whenever possible.

Staff has examined the mitigation measures proposed by Mirant and concluded that the measures together with applicable LORS will adequately assure that no significant environmental impacts will result from the management and disposal of project-related waste.

## **CONCLUSIONS**

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Management of the wastes generated during operation of the Unit 7 project will not result in any significant adverse impacts if Mirant implements the mitigation measures proposed in the AFC, the additional measure proposed by staff below, and the proposed conditions of certification.

Staff recommends that, during excavation activities, Mirant have a Registered Professional Engineer or Geologist available to determine the need for sampling when contamination is suspected. The Engineer or Geologist shall inspect the site, determine the need for sampling to confirm the nature and extent of contamination, and file a written report to the project owner and CPM stating the recommended course of action, prior to any further construction activity at that location. If significant remediation may be required, Mirant will be required to contact representatives of the San Francisco Department of Public Health, the Berkeley Office of the California Department of Toxic



Substances Control, and the San Francisco Bay Regional Water Quality Control Board for consultation and possible oversight of remedial activities.

## CONDITIONS OF CERTIFICATION

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**WASTE-1** The project owner shall obtain a hazardous waste generator identification number from the Department of Toxic Substances Control prior to generating any hazardous waste.

**Verification:** The project owner shall keep its copy of the identification number on file at the project site and notify the CPM of its receipt via a copy included with the monthly compliance report.

**WASTE-2** Upon becoming aware of any impending waste management-related enforcement action by any local, state, or federal authority, the project owner shall notify the CPM of any such action taken or proposed to be taken against the project itself, or against any waste hauler or disposal facility or treatment operator with which the owner contracts.

**Verification:** The project owner shall notify the CPM in writing within 10 days of becoming aware of an impending enforcement action. The CPM shall notify the project owner of any changes that will be required in the manner in which project-related wastes are managed.

**WASTE-3** Prior to the start of (1) site mobilization and (2) operation, the project owner shall prepare and submit to the CPM, for review and approval, waste management plans for all wastes generated during construction and operation of the facility, respectively. The plans shall contain, at a minimum, the following:

- A description of all waste streams, including projections of frequency, amounts generated and hazard classifications; and
- Methods of managing each waste, including treatment methods and companies contracted with for treatment services, waste testing methods to assure correct classification, methods of transportation, disposal requirements and sites, and recycling and waste minimization/reduction plans.

**Verification:** No less than 45 days prior to the start of site mobilization, the project owner shall submit the construction waste management plan to the CPM for approval. The operation waste management plan shall be submitted to the CPM for approval no less than 60 days prior to the start of project operation. The project owner shall submit any required revisions within 30 days of notification by the CPM (or mutually agreed upon date). In the Annual Compliance Reports, the project owner shall document the actual waste management methods used during the year compared to planned management methods.

**WASTE-4** The project owner shall have a Registered Professional Engineer or Geologist, with experience in remedial investigation and feasibility studies, available for consultation during soil excavation and grading activities. The Registered Professional Engineer or Geologist shall be given full authority to oversee any earth moving activities that have the potential to disturb contaminated soil.

**Verification:** At least 30 days prior to the start of site mobilization, the project owner shall submit the qualifications and experience of the Registered Professional Engineer or Geologist to the CPM for approval.

**WASTE-5** If potentially contaminated soil is unearthed during excavation at either the proposed site or linear facilities as evidenced by discoloration, odor, or other signs, the Registered Professional Engineer or Geologist shall inspect the site, determine the need for sampling to confirm the nature and extent of contamination, and file a written report to the project owner and CPM stating the recommended course of action, prior to any further construction activity at that location. If, in the opinion of the Registered Professional Engineer or Geologist, significant remediation may be required, the project owner shall contact representatives of the San Francisco Department of Public Health, the Berkeley Office of the California Department of Toxic Substances Control, and the San Francisco Bay Regional Water Quality Control Board for guidance and possible oversight.

**Verification:** The project owner shall submit any reports filed by the Registered Professional Engineer or Geologist to the CPM within 5 days of their receipt.

**WASTE-6** The project owner shall prepare a final Site Mitigation and Implementation Plan (SMIP) in accordance with DTSC comments and the requirements of the Maher Ordinance. The SMIP shall include soil handling and management measures for earth disturbed by trenching for transmission line construction.

**Verification:** At least 45 days prior to ground disturbance, the project owner shall submit the Site Mitigation and Implementation Plan to the CPM for approval, and to the Berkeley Office of the Department of Toxic Substances Control and the San Francisco Department of Public Health for comment.

**WASTE-7** The project owner shall provide confirmation of the removal of hazardous materials from buildings prior to their demolition.

**Verification:** At least 30 days prior to the demolition of any buildings, the project owner shall submit confirmation to the CPM from the licensed hazardous materials abatement contractor that the hazardous materials abatement process has been satisfactorily completed.

**WASTE-8** The project owner shall submit completed construction drawings which indicate the location of the construction contractor's hazardous waste storage area to the CPM and to the Berkeley Office of the Department of Toxic Substances Control. The project owner shall also submit to each of the above a description of how that portion of the storage area used for hazardous excess fill material would meet the requirements for waste pile storage outlined in CCR Title 22 section 66264.250.

**Verification:** Within 30 days of any project-related earth moving, the project owner shall submit to the CPM for approval, and to the Berkeley Office of the Department of Toxic Substances Control for comment, completed construction drawings which indicate the location of the construction contractor's hazardous waste storage area and a description of how that portion of the storage area used for hazardous excess fill

material would meet the requirements for waste pile storage outlined in CCR Title 22 section 66264.250.

**WASTE-9** In the event PG&E cannot fulfill its obligations to remediate existing contamination at the proposed project site, the project owner shall assume such responsibility so that all project-related remediation requirements are completed.

**Verification:** Within 5 days of becoming aware that PG&E cannot fulfill its remediation obligations or that it has failed to fulfill any such obligations, the project owner shall notify the CPM in writing that it intends to fulfill such obligations.

**WASTE-10** On a daily basis, all construction debris shall be removed to a location outside the jurisdiction of the Bay Area Conservation and Development Commission.

**Verification:** Within five days of being notified by the CPM that any construction debris is placed in any area within BCDC's jurisdiction, the project owner shall remove such material to a location approved by the CPM.

**WASTE-11** No bentonite slurry used for project-related drilling shall be reused unless sampling data demonstrates that it has not been contaminated.

**Verification:** Prior to reusing bentonite slurry, the project owner shall submit sampling data to the CPM for approval showing that the slurry is clean and suitable for use at another site.

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# SOIL & WATER RESOURCES

Testimony of Joe Crea, Dominique Brocard, Alvin Greenberg Ph. D.,  
Jim Henneforth, and Mike Krolak

## INTRODUCTION

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This section of staff's Final Staff Assessment (FSA) analyzes potential effects on soil and water resources from the construction and operation of the Potrero Power Plant Unit 7 Project (Unit 7), proposed by Mirant Potrero, LLC ("Mirant" or "applicant"). The analysis focuses on the potential for the project's construction or operation to:

- degrade groundwater supply or quality;
- lead to accelerated wind or water erosion and sedimentation; and
- impact surface water supply or quality, including bay/estuary waters.

This assessment also addresses the project's ability to comply with all applicable federal, state and local laws, ordinances, regulations and standards, identifies mitigation measures and recommends conditions of certification. Where the potential for significant impacts is identified, staff proposes mitigation measures and, as appropriate, recommends conditions of certification to reduce the significance of the impacts.

The **Waste Management** section addresses issues related to remediation of contaminated soil and water. Biological resource issues associated with cooling water intake and discharge are addressed in the **Aquatic Biological Resources** section.

## LAWS, ORDINANCES, REGULATIONS, AND STANDARDS (LORS)

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### FEDERAL

#### Clean Water Act

The Clean Water Act (33 U.S.C. § 1251), formerly the Federal Water Pollution Control Act of 1972, was enacted with the intent of restoring and maintaining the chemical, physical, and biological integrity of the waters of the United States.

The Clean Water Act requires states to set standards to protect, maintain, and restore water quality through the regulation of point source and certain non-point source discharges to surface water. These discharges are regulated by the National Pollutant Discharge Elimination System (NPDES). In California, NPDES permitting authority is delegated to, and administered by, the nine Regional Water Quality Control Boards. A new NPDES permit will be required from the San Francisco Regional Water Quality Control Board (SFRWQCB) for Unit 7 as a new source under the Clean Water Act. The NPDES permit regulates cooling water, other wastewater and operational (industrial) stormwater discharges. Stormwater discharges related to earthmoving activities involving five or more acres of earth disturbance also fall under this act, and are addressed through a General NPDES permit for Stormwater Discharges Associated with Construction Activities.

Toxic substances are regulated by water quality based effluent limitations (WQBELs) derived from the U.S. Environmental Protection Agency (USEPA) national water quality criteria listed in the Basin Plan, the National Toxics Rule (U.S. EPA Gold Book), the California Toxic Rule (CTR), and the State Implementation Policy (SIP). Numeric WQBELs are required for all constituents that have reasonable potential to cause or contribute to an exceedance above any State water quality standard. Reasonable potential is determined and final WQBELs are developed using the methodology outlined in the SIP. Permit effluent limits for conventional pollutants are technology based.

On May 12, 1999, the U.S. EPA approved a revised list of impaired waterbodies prepared by the State pursuant to the Clean Water Act section 303(d). The 303(d) list was prepared to identify specific water bodies where water quality standards are not expected to be met after implementation of technology-based effluent limitations on point sources. Lower San Francisco Bay is listed as an impaired water body. The pollutants impairing Lower San Francisco Bay include chlordane, copper, DDT, diazinon, dieldrin, dioxin compounds, exotic species, furan compounds, mercury, nickel, non dioxin-like PCBs, and dioxin-like PCBs.

Section 316 (33 USC § 1326) of the Clean Water Act specifically addresses thermal discharges and cooling water intake structures. Subsection (a) requires that “... the owner or operator of any such source ... demonstrate to the satisfaction of ... the state that any effluent limitation proposed for the control of the thermal component of any discharge from such source will require effluent limitations more stringent than necessary to assure the protection and propagation of a balanced, indigenous population of shellfish, fish, and wildlife in and on the body of water into which the discharge is to be made ... the state may impose an effluent limitation ... that will assure the protection and propagation of a balanced, indigenous population of shellfish, fish, and wildlife in and on that body of water.”

Subsection (b) of section 316 requires that “... the location, design, construction, and capacity of cooling water intake structures reflect the best technology available (BTA) for minimizing adverse environmental impact.” The U.S. EPA has released revised regulations for Section 316(b) since the PSA was published. These regulations further define the standards for meeting the BTA requirements.

Section 401 of the Act requires that the Regional Water Quality Control Board certify any activity that may result in a discharge into a waterbody. This certification ensures that the proposed activity will not violate state and federal water quality standards.

Section 404 of the Clean Water Act regulates the discharge of dredged or fill materials into the waters of the United States, including rivers, streams, and wetlands. The U.S. Army Corps of Engineers administers the Section 404 permit program. The application for a Dredge Permit is administered through the San Francisco Dredged Material and Management Office (DMMO). The construction of the intake and outfall structures will require an Individual Permit. This permit is issued every 10 years. Maintenance dredging is also a permitted activity. Each activity is considered an episode. Depending on the location of the dredged material, maintenance dredging will be permitted under the Individual Permit or a 2-year Nationwide Permit.

## **Numeric Criteria for Priority Toxic Pollutants for the State of California (May 18, 2000)**

This rule was recently promulgated by the USEPA to fill a gap in the California water quality standards created in 1994 when a State court overturned the State's water quality control plans which contained water quality criteria for priority toxic pollutants. This new rule provides criteria applicable in the State of California for inland waters, enclosed bays and estuaries for all purposes and programs under the Clean Water Act.

### **River and Harbor Act**

Section 10 of the River and Harbor Act of 1899 specifies permit requirements for work on structures over, in, and/or under navigable waters of the United States (33 U.S.C. Section 403). The purpose of this law is to preserve the navigability of the waters of the United States by prohibiting the unauthorized obstruction or alteration of any navigable waters. The installation of the proposed outfall structures in the San Francisco Bay and the transmission line under Islais Channel require a Section 10 permit. Navigational provisions affiliated with the U.S. Coast Guard include the addition of navigational devices and a "Notice to Mariners," which will alert boaters as to when and where obstructions to navigable waters will occur. Section 10 is administered by the U.S. Army Corps of Engineers.

## **STATE**

### **Porter-Cologne Water Quality Control Act**

The Porter-Cologne Water Quality Control Act of 1967, Water Code Section 13000 et seq., requires the State Water Resources Control Board (SWRCB) and the nine RWQCBs to adopt water quality criteria to protect state waters. These criteria include the identification of beneficial uses, narrative and numerical water quality standards and implementation procedures. The criteria for the project area are contained in the *Basin Water Quality Control Plan – San Francisco Bay Basin* (RWQCB, 1995).

The RWQCBs are also required to ensure the protection of water quality through the regulation of waste discharges to land. Such discharges are regulated under Title 23, California Code of Regulations, section 2200 et seq. These regulations require that the RWQCB issue a Waste Discharge Requirement regarding the discharge of waste (soil) into surface waters resulting from land disturbance.

### **California Constitution**

California Constitution, Article 10, §2. The water resources of the state should be put to beneficial use to the fullest extent possible. The waste or unreasonable use or unreasonable method of use of water is prohibited and water conservation is encouraged. The right to water or to the use of the flow of water and riparian rights are to be maintained by reasonable methods of diversion and use.

### **California Water Code**

California Water Code § 13550 states that the use of potable domestic water for nonpotable uses, including industrial uses, is a waste or an unreasonable use of the water within the meaning of Section 2 of Article X of the California Constitution if recycled water is available.

California Water Code 13552.8 states that any public agency of the state may require the use of recycled water in cooling towers if all of the following requirements are met: 1) it is available; 2) will not cause any loss of water right; 3) if mist control is provided, and; 4) if title 22 requirements are met.

California Water Code § 13260 requires that, as part of the NPDES permit, any person discharging waste, or proposing to discharge waste, within any region that could affect the quality of the waters of the state, other than into a community sewer system must submit a report of waste discharge to the respective RWQCB.

## **State Water Resources Control Board Plans**

### **California Thermal Plan**

In 1972, the State Water Resources Control Board adopted the “Water Quality Control Plan for the Control of Temperature in the Coastal and Interstate Waters and Enclosed Bays and Estuaries of California”, more commonly known as the Thermal Plan. The Thermal Plan, which was later amended in 1975, sets limits on the discharge of wastewaters with elevated temperatures into coastal, estuarine and interstate waters in order to meet water quality objectives. A major aim of the Thermal Plan is to protect marine resources in the ocean, enclosed bays and estuaries from the adverse impacts of thermal waste.

Thermal waste is defined as cooling water and industrial process water used to carry waste heat from such large point sources as power plants. There are two categories of discharges: “existing”, which are discharges in place or under construction prior to the plan’s 1971 adoption; and “new”, which are discharges developed after the plan was adopted. The proposed project is considered a *new* discharge under the Thermal Plan by the SFRWQCB (Huang 2001). The project will be discharging to Lower San Francisco Bay using a new multipoint diffuser.

The project is a new discharge in an enclosed bay, for which the applicable water quality objectives in the Thermal Plan are:

- Elevated temperature waste discharges shall comply with limitations necessary to assure protection of beneficial uses. The maximum temperature of waste discharges shall not exceed the natural temperature of the receiving waters by more than 20°F.
- Thermal waste discharges having a maximum temperature greater than 4°F above the natural temperature of the receiving water are prohibited.

The Thermal Plan provides the authority for the RWQCB to grant exceptions to the specific water quality objectives in accordance with Section 316(a) of the Clean Water Act. Such exemptions require the approval of the SWRCB.

### **California Ocean Plan**

In 1997, the SWRCB (Resolution 97-026) adopted the latest version of the Water Quality Control Plan for Ocean Waters of California (California Ocean Plan). The California Ocean Plan establishes beneficial uses and water quality objectives for the



state's ocean waters outside of enclosed bays, estuaries and lagoons. The plan also sets forth effluent limitations, management practices and prohibitions. Every three years the plan is reviewed and, if necessary, updated.

### **California Coastal Act of 1976**

Chapter 3 (Pub. Resources Code §30000 et seq.). Coastal Resources Planning and Management Policies, Article 4, Marine Environment. Section 30231. This section requires that the "...biological productivity and the quality of coastal waters, wetlands, estuaries and lakes shall be maintained by minimizing adverse effects of wastewater discharges and entrainment, controlling runoff, preventing depletion of groundwater..."

## **STATE POLICIES**

### **State Water Resources Control Board Policies**

The SWRCB has also adopted a number of policies that provide guidelines for water quality protection. The Water Quality Control Policy on the Use and Disposal of Inland Waters Used for Power Plant Cooling (adopted by the Board on June 19, 1976 by Resolution 75-58) states that use of fresh inland waters should only be used for power plant cooling if "the other sources or other methods of cooling would be environmentally undesirable or economically unsound." This SWRCB policy requires that power plant cooling water should come from, in order of priority: wastewater being discharged to the ocean, ocean water, brackish water from natural sources or irrigation return flow, inland wastewaters of low total dissolved solids, and other inland waters. This policy also defines cooling water discharge prohibitions.

The principal policy of the State Board, which addresses enclosed bays and estuaries, is the "Water Quality Control Policy for the Enclosed Bays and Estuaries of California" (adopted by the Board on May 16, 1974 by Resolution 74-43). This policy contains a number of prohibitions on waste discharges including chemical, biological and petroleum related waste.

## **REGIONAL**

### **Dredge Material Reuse/Disposal Application**

The San Francisco Bay Dredged Material Management Office (DMMO) aims to provide a cooperative permitting framework that reduces redundancy and expedites the processing of applications for dredging and dredged material disposal while fostering consensus decision-making primarily among the following member agencies: U.S. Army Corps of Engineers (ACOE) San Francisco District, U.S. Environmental Protection Agency, San Francisco Bay Regional Water Quality Control Board, San Francisco Bay Conservation and Development Commission, and the State Lands Commission. Because the areas of expertise differ among each of the aforementioned agencies, the coordination of knowledge among DMMO staff ensures consistency throughout the permitting process.

The DMMO provides a Dredge Material Reuse/Disposal Application, which is a consolidated application that covers Section 404 and/or Section 10 dredging permits, and that provides information for other involved agencies as part of their permitting

process. Each of the agencies involved conduct separate reviews and make determinations accordingly as to the issuance of the permit. The Dredge Material Reuse/Disposal Application is functionally equivalent to a RWQCB Report of Waste Discharge, pursuant to Article 4, Chapter 4 of the Porter-Cologne Water Quality Control Act and will satisfy Section 401 of the Clean Water Act. Section 10 of the River and Harbor Act authorizes the ACOE to issue permits related to dredging and filling operations within navigable waters of the U.S. Section 404 of the Clean Water Act regulates the discharge of dredged or fill materials into the waters of the United States, including rivers, streams, and wetlands.

The dredged sediment is characterized by the DMMO for its physical, chemical, and biological properties via a sample and analysis plan. Once the plan is reviewed, the DMMO then determines suitability for fill placement.

### **McAteer - Petris Act**

The McAteer - Petris Act, which is overseen by the San Francisco Bay Conservation and Development Commission (BCDC), aims to preserve San Francisco Bay from indiscriminate filling. Intake structures, discharge pipes, diffusers, and associated materials are considered fill under Section 66632(a) of the Act. Section 66605 provides criteria that must be satisfied before fill in the Bay can be authorized. The criteria include: (1) fill in the Bay can be authorized only when the public benefits of the fill exceed the public detriment from the loss of water areas; (2) the fill must be limited to water-oriented uses (such as water intake and discharge lines for power generating plants), or minor fill for improving shoreline appearance or for public access; (3) fill can be authorized only when no alternative upland location exists for such purposes; (4) the water area authorized to be filled should be the minimum necessary to achieve the purpose of the fill; and (5) the nature, location and extent of any fill should be such that it will minimize harmful effects to the Bay Area, such as, the reduction or impairment of the volume surface area or circulation of water, water quality, fertility of marshes or fish or wildlife resources, or other conditions impacting the environment, as defined in Section 21060.5 of the Public Resources Code...”

### **San Francisco Bay Plan**

The BCDC is charged with determining how the future development of the Bay should proceed and with protecting the beneficial uses and preserving San Francisco Bay. The policies, recommendations, decisions, advice, and authority of the SWRCB and SFRWQCB are the basis for carrying out BCDC's water quality responsibilities. The San Francisco Bay Plan policies on dredging and dredged material disposal emphasize that both activities should be conducted in an environmentally and economically sound manner. Provisions are established by the BCDC, California Department of Fish and Game (CDFG), RWQCB, National Marine Fisheries Service (NMFS), and United States Fish and Wildlife Service before issuing authorization. The San Francisco Bay Plan was adopted by the Commission in 1968 and forwarded to the California Legislature and the Governor in 1969.

Part 3, Water Quality, Policy 2 requires consultation with the SFRWQCB and the SWRCB for projects involving Bay fill.

Part 3, Water Quality, Policy 3 maintains that soil erosion reduction methods should be incorporated into the design and construction of shoreline projects in order for the Bay to be protected from increased sedimentation.

Part 3, Water Quality, Policy 4 states that polluted runoff from projects should be controlled by the use of best management practices in order to protect the water quality and beneficial uses of the Bay, especially where water dispersion is poor and near shellfish beds and other significant biotic resources. Whenever possible, runoff discharge points should be located where the discharge will have the least impact. Approval of projects involving shoreline areas polluted with hazardous substances should be conditioned so that they will not cause harm to the public or the beneficial uses of the Bay (SF Bay Plan, 1987).

Part 4, Dredging, Policies 1-11 describe acceptable dredge operation parameters, including non-tidal and ocean disposal techniques, channel type specifications, soil erosion control measures, and the protection of underground freshwater resources.

## **LOCAL**

### **San Francisco Public Health Code**

Pursuant to Section 1001 of the San Francisco Public Works Code, the applicant must comply with Article 22A of the City and County of San Francisco Public Health Code, formerly known as the Maher Ordinance, which governs development of properties on fill that is known to or is suspected of containing contaminated soils.

Under the San Francisco Building Code provisions, applicants for any building or grading permit which involves the disturbance of at least 50 cubic yards of soil shall comply with the requirement for soil sampling and analysis of Article 22A of the Public Health Code.

This ordinance provides that no building permit application subject to the requirements of this section shall be approved until the Department receives written notification from the Director of Public Health that the applicant has complied with all applicable provisions of Article 22A of the Public Health Code, or verification that the requirements have been waived.

### **San Francisco Building Code, Chapter 3**

The San Francisco Building Code (SFBC) adopts Chapter 33 of the Uniform Building Code (UBC) and the California Building Code (CBC), which establishes excavation, grading and erosion control standards. The standards include specifications pertaining to excavation of fills for buildings or structures, grading associated with construction of utilities, and storm water drainage.

### **San Francisco Municipal Code**

#### **Industrial Waste Water Discharge Permit**

The discharge of any industrial wastewater to the sewer would normally require approval by the City and County of San Francisco Public Utilities Commission, Bureau

of Environmental Regulation and Management for a batch wastewater permit. The permit is issued pursuant to provisions of Sections 120, 124, and 125 of Chapter X (Public Works Code) of Part II of the San Francisco Municipal Code, Article 4.1. The purpose of this Article and the City's industrial waste pretreatment program is to protect human health and the environment by preventing the discharge of pollutants into the sewerage system that would: (i) obstruct or damage the system; (ii) interfere with, inhibit or disrupt treatment facilities and processes, or the processing, use or disposal of sludge; (iii) pass through the sewerage system and contribute to violations of regulatory requirements imposed on the City; or (iv) otherwise harm, or threaten to harm human health or the environment.

The permit would limit pollutants in the wastewater to acceptable levels and require periodic sampling of the discharge. Permit applications would apply to both normal plant waste discharges and to the disposal for dewatering should the applicant select discharge to the sewer as the method for disposal.

### **Batch Wastewater Discharge Permits**

No person shall discharge groundwater or water from sumps or dewatering facilities into the sewerage system without a permit. An application for a permit pursuant to this subsection shall be submitted no later than 45 days prior to the proposed commencement of the discharge. Each permit for groundwater discharge shall contain appropriate discharge standards and any other appropriate requirements that must be achieved before discharge into the sewerage system may commence. The lead agency may require the discharger to install and maintain meters at the discharger's expense to measure the volume of the discharge.

### ***Permit General Provisions***

In addition to numerical standards, provisions of the permit would require that all dischargers must comply with all requirements set forth in federal Categorical Pretreatment Standards and other applicable federal regulatory standards, applicable State orders and water quality control regulations, sewage discharge permits and orders issued to the City by federal and State agencies, federal and State pretreatment program approval conditions, local discharge limitations and regulations promulgated by the General Manager and the City, and any other applicable requirement regulating the discharge of wastewater into the sewerage system.

Any discharger shall not discharge to the sewer any wastewater, in temperature or quantity, which will cause the temperature of influent to exceed 104°F at the point of introduction to any City wastewater treatment plant.

### **San Francisco General Plan**

The San Francisco General Plan sets out various policies pertaining to soil and water resources, discussed in the following sections: new structures (policy 2.3); new development (policy 2.9); bay, ocean and shoreline (policies 3 and 4); and land (policy 3). Guidelines pertaining to soil conditions; geologic hazards; bay, ocean and shoreline area resources; water pollution, resource conservation and filling of land are described in the aforementioned policies.

## SETTING AND PROJECT DESCRIPTION

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### ENVIRONMENTAL SETTING

The proposed Unit 7 project is located on the south-central portion of the existing Potrero Power Plant (Potrero PP) site, which is located on the eastern side of the City and County of San Francisco (CCSF) along the western shore of San Francisco Bay. In addition to San Francisco, surrounding communities include South San Francisco and Daly City to the south, and Alameda and Oakland to the east across the San Francisco Bay. The facility is located on the San Francisco Peninsula within the northern Coast Ranges physiographic province. A north-northwest trending series of mountains and intervening valleys that extend from the Oregon border south to the Transverse Ranges of southern California characterizes the province. The plant site is bounded immediately on the east by San Francisco Bay with hills rising to the west across the San Francisco Peninsula.

The project site is essentially flat with elevations ranging from about 13 to 35 feet above mean sea level (MSL) increasing in elevation westward away from the Bay. The elevation of the proposed project site is approximately 30 feet above MSL (SECAL 2000a).

The CCSF area receives an annual precipitation of approximately 20 inches with more than 80% of the precipitation occurring from November through March. The climate is characterized by mild wet winters and cool dry summers. During the winter, average low and high temperatures (°F) vary from the mid-40s to the mid-50s, respectively. The summer average low and high temperatures (°F) range from the mid-50s to the mid-60s respectively.

### **Surface Waters**

The two surface water bodies in the vicinity of the proposed project are the Lower San Francisco Bay and Islais Creek. There are no delineated wetlands on the site (SECAL 2000b).

### **Lower San Francisco Bay**

The proposed project is located on the western shoreline of the Lower San Francisco Bay, in the basin designated as Central Basin (3) by the Regional Water Quality Control Board (CRWQCB, 1995). Sub-areas of the bay in proximity to the site include the Golden Gate Channel to the north, Warm Water Cove immediately to the south, and Central San Francisco Bay to the east.

Surface waters in the area are affected by currents in San Francisco Bay in the vicinity of the Potrero PP and are dominated by tidal action. The mean tidal range at Potrero PP is 4.6 feet. The average incoming flood tides flow southward at approximately 2.5 knots, while outgoing ebb tides flow northward towards the Golden Gate at approximately 2.3 knots (SECAL 2000b).

Salinity in this area of Lower San Francisco Bay varies significantly both seasonally and during the tide cycle. Salinity is lower in the winter due to the larger fresh water inflow

to the Bay, with concentrations as low as 12 parts per thousand (ppt), while in the summer, salinity is on the order of 30 ppt. The annual average is 28 ppt (SECAL 2000a).

Seasonal water temperatures in San Francisco Bay vary geographically with depth, tidal influence, and ambient temperatures. Water temperatures taken at the existing Potrero PP Unit 3 electrical generation plant intake between November 1997 and April 2000 show daily averages ranging from a minimum of 43.6°F to a maximum of 63.7°F with an average of 55.7°F (SECAL 2000a).

As stated above, Lower San Francisco Bay is on the 303(d) list of impaired water bodies relative to chlordane, copper, DDT, diazinon, dieldrin, dioxin components, exotic species, furan compounds, mercury, nickel, and polychlorinated biphenyls (PCBs).

Beneficial uses of the local waters for San Francisco Bay Central as determined by the Regional Water Quality Control Board (CRWQCB, 1995) are:

- ocean, commercial, and sport fishing
- estuarine habitat
- industrial service supply
- fish migration
- navigation
- industrial process supply
- preservation of rare and endangered species
- water contact recreation
- non-contact water recreation
- shellfish harvesting
- fish spawning

### **Islais Creek**

Islais Creek was historically part of the Islais Creek estuary; however, over the years, artificial fill consisting of sand, rock, and garbage from former city dumps have completely destroyed the estuarine environment. The proposed underground transmission line from Unit 7 to the existing Hunters Point Substation will cross under Islais Creek.

### **Groundwater**

The proposed Unit 7 site is underlain by Franciscan complex serpentine bedrock and Quaternary alluvium. The eastern portion of the site is underlain by approximately 30 feet of artificial fill that consists of construction rubble and bedrock. The artificial fill overlies Bay Mud deposits. The fill and fractured bedrock serve as a water-bearing unit for the brackish groundwater; however, the Bay Mud that underlies the fill in the eastern portion of the site restricts any vertical movement of groundwater. The Depth to groundwater ranges from approximately 3.5 feet below ground surface around the

central portion of the site to approximately 21 feet below ground surface near the bay. Groundwater flow is generally towards the east-southeast with an upper gradient of 0.02 and a lower gradient near the eastern portion of the site of approximately 0.006.

The quality of groundwater beneath the site area is brackish, with total dissolved solids (TDS) between 300 and 28,600 milligrams per liter (mg/L) with an average TDS of 4,500 mg/L. The State Water Resources Control Board Resolution No. 88-63 indicates that groundwater with TDS exceeding 3000 mg/L is not considered suitable for municipal or domestic water supply. Due to the levels of TDS in the groundwater, it is not considered usable for drinking and treatment is considered too expensive to be practical for municipal purposes (SECAL 2000a).

### **Groundwater Contamination**

Although no groundwater sample was actually collected, groundwater contamination at the site was considered possible by a Phase I Environmental Site Assessment (CDM, 1997). Groundwater contamination was found during sampling for the Phase II Environmental Site Assessment (Fluor Daniels GTI, 1998) and an additional Site Characterization study (Geomatrix, 2000). The following contaminants were detected: Total petroleum hydrocarbons (TPHs), benzene, poly-aromatic hydrocarbons (PAHs), metals, volatile organic compounds, and cyanide. In general, the contaminant concentrations were relatively low, but some exceeded regulatory thresholds. A more complete description of groundwater contamination is included in the **Waste Management** section of this FSA. In addition to dissolved contaminants, light and dense non-aqueous phase liquids (LNAPL and DNAPL) were found. In the vicinity of the excavation footprint, DNAPL thickness ranged from about 3 to 14 feet, at a depth of about 35 feet below ground surface. Leachability tests indicated that the DNAPL has the potential to leach dissolved constituents. This phenomenon may be enhanced by groundwater flow in the DNAPL areas resulting from dewatering, and may bring dissolved contaminants to areas where contamination is not currently observed. This may also result in contaminants being found in the dewatered groundwater.

### **Offshore Contamination**

Mirant conducted offshore sediment sampling at approximately 12 locations. The sediment sampling locations, labeled PP-1 through PP-12, are approximately 50 to 250 feet offshore in the vicinity of the originally proposed Units 3 & 7 intake/outfall structures. Sediment cores down to 12 feet deep were collected every three feet to provide samples for testing. The sediment samples were tested for total solids (TS), total organic content (TOC), metals, polychlorinated biphenyls (PCBs), pesticides, TPHs, and PAHs. Some samples were also tested for cyanide, volatile and semi-volatile organic compounds (VOCs/SVOCs).

The sampling results revealed elevated amounts of PAH concentrations at three near-shore areas, with the highest PAH concentration approximately 65 feet west and 50 feet north (PP-1) of the existing Unit 3 cooling water intake. The analysis showed increasing levels of PAHs as the depth increased. The three PAH indicator chemicals are benzopyrene, pyrene, and naphthalene. Naphthalene was discovered in the deepest sample. Other sampling locations revealed lower levels of PAHs. Most other

aforementioned compounds were at or slightly above background levels (SECAL 2000Seds1).

Because the initial sampling program did not provide characterization of the sediment quality, a second offshore sediment sampling analysis was conducted during January 2001 and submitted to the Energy Commission on May 18, 2001. The purpose of the additional characterization was to evaluate horizontal and vertical extents of offshore contamination and to locate offshore areas that have minimal contamination.

The applicant collected samples at an additional 19 sampling locations labeled PP-13 to PP-31. Out of the 19 sampling locations, 6 of these locations were sampled for TS, TOC, approximately 10 metals, TPHs, PAHs, and PCBs. The remaining 13 locations were analyzed for only PAH and TPH as the applicant has indicated that the initial offshore sampling results for metals and PCBs/pesticides were similar to background concentrations (MIRANT2001Seds2).

Sampling results indicated that the locations with elevated PAH levels were near shore, off of the northeastern corner of the site with concentrations increasing with depth. TPH samples reflected concentrations vs. location and depth comparable to the PAH sampling results. The concentration of total PAHs in surface and near-surface sediments samples collected from 0-4 feet depths (e.g., the biologically active portion of the sediment) range from 1,780 to 17,760 parts per billion (ppb). This range includes concentrations that are above sediment thresholds reported by the RWQCB of 4,022 ppb and 3,390 ppb for effects range low (ER-L) and ambient San Francisco Bay sediment values, respectively suggesting the potential for toxic effects. Out of the 6 locations that included sampling for metals, all locations contained detectable concentrations of arsenic, chromium, copper, lead, mercury, nickel, silver, and zinc with the highest concentrations of metals near the location of the existing Unit 3 outfall. PCBs and pesticides were detected in a few of the samples. Refer to the **waste Management** section of the FSA for further discussion of the aforementioned issues.

## **Soils**

The Potrero PP site is located in the northern Coast Ranges, a series of northwesterly-trending ridges. The site is underlain with Franciscan complex serpentine bedrock and Quaternary alluvium. The eastern part of the site is underlain with approximately 30 feet of fill, consisting of rubble and reworked bedrock. The fill overlies Bay Mud deposits. Bedrock is exposed in a ridge on the northwestern corner of the site. The eastern third of the plant is reclaimed land, the former shoreline projects in a roughly north-south direction across the plant site. The reclaimed land is comprised of artificial fill overlying former alluvium and estuarine deposits of Islais Creek. The fill consists of a heterogeneous mixture of sands, gravels, and silts with abundant rubble and debris that ranges up to approximately 45 feet in thickness (SECAL 2000a).

The proposed Unit 7 facility will be located on Urban Land (Map Unit 131) soils whereas the underground transmission line will be located on Urban Land – Orthents, Reclaimed Complex, 0 to 2 Percent Slopes (Map Unit 134) soils (SECAL 2000a). The Urban Land soil type is characterized as having more than 85 percent of the surface covered by paving and various structures. The slopes of this soil type range from 0 to 5 percent. The Urban Land and Urban Land – Orthents, Reclaimed Complex, 0 to 2 Percent



Slopes soil type has various aggregate components such as soil, gravel, concrete and asphalt rubble, solid wastes, and Bay Mud. This soil type is very deep with poor drainage conditions.

### **Soil Contamination**

Soil contamination was identified in a Phase I Environmental Site Assessment (CDM 1997). This included apparent contamination by organics and heavy metals, tank and drum storage on unpaved areas, unknown constituents in the artificial fill in the eastern part of the site, and a possible 1988 asbestos release. Soil contamination was further characterized during the Phase II Environmental Site Assessment (Fluor Daniel 1998) through the analysis of soil samples in areas identified in the Phase I assessment. Contaminants identified in the site soils included TPHs, PAHs, metals, VOCs, cyanide, PCBs, phenolic compounds, and asbestos. Further details on these contaminants are provided in the **Waste Management** section of this FSA.

### **EXISTING POTRERO POWER PLANT**

The Potrero PP Unit 7 site has a long history of industrial operations. Landfill operations began around 1870 and continued until 1910. The earliest industrial operations began in 1872, when the site was used for a manufactured gas plant. The plant was constructed at the northern portion of the existing Potrero property. Subsequent industrial operations at the Potrero property include sugar refining, coal gasification, power generation, and a barrel manufacturing facility.

The Potrero PP facility currently consists of the existing Unit 3 gas fired conventional steam turbine/boiler unit rated at 206 MW, and Units 4, 5, and 6 that are each 52 MW combustion turbine units. Units 4, 5, and 6 are currently used primarily for electricity peaking needs and fueled by distillate oil. Mirant plans to continue operating all generating units at the Potrero PP site available for the foreseeable future (SECAL 2000a). The conventional technology used for the existing Unit 3 produces high-pressure steam in a boiler that is fueled by natural gas and directs the steam to a steam turbine that drives a generator to produce the electricity.

### **Existing Water Supply**

Unit 3 uses seawater to cool the steam that is exhausted from the steam turbine into a condenser. The seawater is drawn from the San Francisco Bay, passed through a non-direct contact condenser, and returned to the Bay. The existing seawater intake structure is located on the waterfront near the northeast corner of the project site. The design water flow for Unit 3 is 157,000 gallons per minute (gpm) or 226 million gallons a day (mgd) for the circulating water and 4,000 gpm (5.76 mgd) for water wash (SECAL 2000a).

Mobile truck mounted demineralizers supply process water for make-up to the steam cycle of Unit 3 at a rate of up to 400 gpm (0.6 mgd). Raw water is fed to the demineralizers from the CCSF. The water treatment vendor owns the units. Regeneration of the catalyst beds and other maintenance cycles are performed off-site at the vendor's facilities. Wastewater from the demineralizer is considered to be of drinking water quality. However, it will be disposed of directly into CCSF's stormwater system.

The existing on-site potable water supply serves the personnel needs of the plant staff along with miscellaneous equipment cleaning and cooling requirements. Currently approximately 35 personnel work on-site as permanent staff. This number will increase by approximately 10 people with the operation of the new unit.

### **Existing Wastewater**

Currently, sources of wastewater generated by power plant operation and maintenance include seawater that has been circulated through the plant condensers, discharge of intake screen wash, evaporator cooler blowdown, boiler blowdown, washwater, floor drain water, sanitary waste, and other miscellaneous plant liquids. The existing plant is operated under a NPDES permit (No. CA 0005657) issued by the SFRWQCB. This permit describes the existing discharge as a once through system with an annual average flow of 226 million gallons per day (mgd) (approximately 157,000 gpm) at a condenser temperature rise of 15°F.

### **Existing Cooling Water Discharge**

Currently, the Potrero PP Unit 3 discharges cooling water through a channel outfall cut into the seawall. As described by the NPDES permit, the average annual condenser temperature rise is 15°F, however, at full power production (210 MW), the temperature rise is approximately 19°F. A characterization of the thermal plume was conducted in 1989-90 (PG&E, 1991). The plume extends north during ebb tide and south during flood and the size of the plume varies during the tide cycle and as a function of the plant load. At full load, the 4°F temperature rise above ambient temperature isotherm (line of constant temperature) has a length of 1,000 to 2,000 ft (SECAL 2000a - Appendix G). The thermal plume reaches the shore over varying lengths, because the discharge is at the shore. The area of shoreline affected is immediately adjacent to either side of the discharge, depending on the time in the tide cycle. Thermal mapping conducted in 1989 showed a shoreline length of up to 850 ft. affected by a temperature rise exceeding 4°F.

## **PROPOSED UNIT 7 PROJECT**

The Unit 7 addition will consist of one new combined cycle unit using two GE 7FA natural gas fired combustion turbines, two heat recovery steam generators (HRSG), and one steam turbine. Unit 7 will have a nominal rating of 540 MW. The actual output of the unit will vary in response to ambient air temperature conditions, use of evaporative coolers, power enhancement to the combustion turbines, and the use of supplemental firing (duct firing) in the HRSGs to increase steam pressure. Full load output of the unit under expected operating conditions (both combustion turbines and steam turbine generator running) will range from approximately 527 MW net to a peak of 615 MW net (SECAL 2000a).

### **Water Supply**

The new power plant requires water for circulating cooling water, combustion turbine evaporative cooler make-up water, steam cycle water make-up, utility water, potable water, and miscellaneous uses.

Water from the San Francisco Bay will be used in the heat rejection cycle providing cooling water to the non-direct contact surface condenser that condenses steam from

the exhaust of the steam turbine. Additionally, water from the Bay will be circulated through plant service water coolers. The cooling water for the condenser and the service water coolers will be discharged back to the San Francisco Bay. The circulating water requirement for Unit 7 will be approximately 158,000 (gpm) or 228 mgd and 4,000-gpm (5.76 mgd) screen wash water. This flow consists of 148,000 gpm (213 mgd) for the steam cycle condenser and 10,000 gpm (14 mgd) for the service water cooling system. To obtain the circulating water, a new intake structure will be constructed with sufficient capacity to withdraw water for the cooling requirements of both the existing Unit 3 and the new Unit 7. Unit 3 requires 157,000 gpm (226 mgd), thus the new intake system will have a capacity of 315,000 gpm (454 mgd) (SECAL 2000a).

Evaporative coolers will use approximately 50 gpm (0.07 mgd) of City of San Francisco water supply. The coolers are used on the inlets to the combustion turbines to improve the output of the units during periods of high ambient temperatures. Since the combustion turbines generate power using the expansion of hot gases through a power turbine they are sensitive to the mass flow of air through the machines. The air is less dense in high ambient temperatures and therefore the amount of power produced is reduced. By circulating water across media at the turbine air inlet, the effect from evaporation reduces the inlet air temperature thereby increasing the air density and thus the output of the turbine. Water is made up to the evaporative coolers to replace that which is lost due to evaporation and blowdown. CCSF will provide evaporative cooler make-up water to the plant.

Make up process water will be required for the steam cycle to replace losses as well as water that is blown down to maintain purity. This use will require between 23 and 131 gpm (0.03 and 0.19 mgd), depending on operating conditions. Process water for make-up to the steam cycle will be demineralized water produced by mobile truck mounted demineralizers. Raw water will be fed to the demineralizers from the CCSF water system. The water treatment vendor will own the demineralizer units. Regeneration of the catalyst beds and other maintenance cycles are performed off-site at the vendor's facilities.

Other plant water uses for demineralized water will be wash water for equipment maintenance, and make-up water to the closed loop service water cooling system. The service water cooling system has a design flow of 10,000 gpm (14 mgd) (SECAL 2000a). This system will provide cooling water to other plant equipment. This system will operate in parallel with the steam condenser, providing service water to the combustion turbine and steam turbine lube oil coolers, the steam turbine generator hydrogen coolers, the condenser vacuum pump coolers, the feed pump coolers, and the combustion turbine generator coolers.

Potable water uses will include utility services such as wash down of equipment areas, potable and sanitary use, and firewater. Potable water will be provided by the City of San Francisco. These uses will require a flowrate of approximately 2 gpm on average.

Table 1 shows the estimated daily water requirements at average daily and annual operations.

**SOIL & WATER RESOURCES TABLE 1**  
**Unit 7 Daily Water Requirements**

<b>Water Use</b>	<b>Source</b>	<b>Average Requirements (gpm)<sup>a</sup></b>	<b>Average Annual Requirements (gpm)<sup>b</sup></b>
Circulating Water Make-up	San Francisco Bay	158,000	158,000
Evaporative Cooler Make-up	City Water Supply	50	13
Steam Cycle Make-up	City Water Supply (Expanded Demineralized Water System)	23-131	36
Potable Water	City Water Supply	1	1
Equipment Wash Water	City Water Supply	1	1

Notes:

<sup>a</sup> Range of operating conditions averaged daily over 24 hours

<sup>b</sup> Average total annual requirements as hourly use  
 SECAL 2000a, AFC page 2-46

## **Water Quality**

Wastewater disposal can lead to soil, surface water, and groundwater degradation and impairment of beneficial uses.

## **Wastewater Discharge**

Mirant proposes to discharge the spent cooling water from the existing Unit 3 and the proposed Unit 7 through separate outfalls. Each discharge will consist of a pair of new 54-inch diameter pipes laid on the bottom of the Bay and extending offshore approximately 900 feet using a diffuser configuration (SECAL 2000a). For more information, please refer to the **Cooling Water System** discussion below.

The chemicals that will be used to clean the intake and discharge structures are sodium hypochlorite and sodium bisulfate. The cooling water will initially be dosed with sodium hypochlorite, which will be converted to chlorine to treat microfouling. The sodium bisulfate will then be added and will act as a chlorine scavenger, removing the chlorine before it can be discharged into the Bay.

Thermal demusseling, which is performed up to twice a month, involves the recirculation, for a period of about 4 hours, of most of the cooling water from the discharge conduit, just before entering the outfall, back to the intake (SEP2001Dres3, Data Response No. 166). At the same time, one of the two cooling water pumps is shut down. As a result, the circulating water temperature increases, and kills the mussels and other marine growth in the intake conduits. The heated water and the biological waste is then discharged through the outfall. Thermal demusselling currently occurs, and would continue to occur, during the weekend evening when the power production level is low. The discharge during the demusseling events is about 4,000 gpm (5.6 mgd), at a discharge temperature of 100°F, with a maximum of 110°F. The applicant is expecting that the receiving water temperature rise for the new combined

cycle unit will be 20°F, however, the temperature rise during demusseling will exceed the 20°F differential.

The applicant submitted an application for a new NPDES permit to the RWQCB on May 17, 2001. The existing Potrero PP discharges cooling water to San Francisco Bay under NPDES Permit CA0005657, which has recently been extended to May 18, 2004. A new NPDES permit will be required for the Unit 7 thermal discharge, as well as the updated Unit 3 thermal discharge. The new permit is expected to contain limits for a number of chemicals. This permit will need to include an exception to the California Thermal Plan in order to allow discharge temperature rises exceeding 4°F for new discharges in enclosed bays. Please refer to the **Environmental Impacts** discussion below for more information on the NPDES permit.

The HRSG and evaporative cooler blowdown will be discharged to the circulating water system outfall. Equipment washdown water will be collected and removed from the site for disposal. Building drains and sanitary wastes will be discharged to the sewer. Water collected from floor drains and equipment containment areas will be treated in the oil/water separator. Oily waste will be retained by the separator and eventually will be disposed of off-site at an appropriately licensed facility, whereas the filtered water will be discharged to the sewer. **SOIL & WATER RESOURCES Table 2** identifies the quantity and discharge location for each of the major wastewater streams.

**SOIL & WATER RESOURCES TABLE 2**  
**Wastewater Streams**

<b>Source</b>	<b>Average Flow gpm</b>	<b>Maximum Flow gpm</b>	<b>Discharge</b>
Circulating Water	148,000	148,000	San Francisco Bay
Service Water Cooling	10,000	10,000	San Francisco Bay
Evaporative Cooler Blowdown	12.5	25.0	San Francisco Bay
HRSG Blowdown	22.0	76.0	San Francisco Bay
Equipment Wash	0.12	81.0	Offsite disposal
Turbine/Building Drains	0	10.0	City Sewer
Sanitary Waste	1.04	20.0	City Sewer
Stormwater Runoff	3.74	500	San Francisco Bay and City Sewer
Floor/Equip Containment Drains	0.21	270.0	Oil/Water Separator
Oil/Water Separator Treated Water	0.21 less contaminants	270.0 less contaminants	City Sewer

SECAL 2000a, AFC page 2-51

CCSF will continue to supply potable water that is used for steam cycle make-up after treatment by the polishing demineralizer. As previously indicated, the demineralizers will be provided by a vendor service.

Total wastewater discharge from Unit 7 would be approximately 158,039.82 gpm (227 million gpd), giving it a flowrate approximately 1 mgd higher than the existing Unit 3 discharge. The total combined discharge from the existing Unit 3 and proposed Unit 7 would be approximately 315,000 gpm (454 mgd).

### **Stormwater Runoff**

Stormwater flows during construction will be directed via a temporary berm or ditch into a temporary sediment basin that would then discharge into a retention pond, and ultimately into the San Francisco sewer system. Stormwater flows associated with the proposed Unit 7 during operation will be directed to existing manholes into the San Francisco sewer system via a retention pond in the existing stormwater management system. This system currently conveys flows to the San Francisco Bay via outfalls E-003 – E-005 and (SECAL 2000b).

### **Spill Prevention**

The applicant has provided a number of provisions for spill prevention control and countermeasure (SPCC). These provisions cover chemical spill control and management of the hazardous materials that will be stored and used on the site (refer to the **Hazardous Materials Management** section of this FSA for more information). Some of the hazardous materials used during construction include petroleum hydrocarbons, cleaning fluids and solvents. Waste generated during construction will be taken to a temporary waste storage facility on-site then transported to an authorized

waste management facility. Aqueous ammonia used in the Selective Catalytic Reduction (SCR) would be stored in aboveground storage tanks that would be surrounded by a containment berm. Other hazardous wastes would be stored separately in containment/treatment facilities that include curbs, berms, concrete pits, and use of double-wall piping (when feasible) to minimize potential of a release from ruptured piping. Containment areas will be drained to appropriate collection sumps or neutralization tanks for recycling or off-site disposal as appropriate (SECAL 2000a).

### **Transmission Facilities**

Two 115-kV transmission cables will connect Unit 7 to the PG&E Hunters Point Substation via an underground route. The transmission route will begin at the corner of Illinois Avenue and 23<sup>rd</sup> Street, continue to the terminus of Illinois Avenue, follow an abandoned railroad right-of-way, cross under Islais Creek, then follow Cargo Way to Jennings Street, Jennings Street to Evans Avenue and down Evans Avenue where it finally connects to the Hunters Point Substation. The total length of the underground transmission line is approximately 9,400 feet.

### **Cooling Water System**

#### **Cooling Water Withdrawal**

To meet the requirements of both the existing Unit 3 and the new Unit 7, a new intake structure will be constructed to replace the existing intake. It will be located on the shoreline near the southern boundary of the plant site and will be designed to provide sufficient flowrates for both Unit 3 and Unit 7. The intake cooling water flow will be increased from the current 157,000 gpm to 315,000 gpm (227 to 454 mgd). The proposed intake structure will be a 54.4-foot by 203.5-foot rectangular structure with the longer dimension parallel to the shoreline. There will be two 31.6-foot by 33-foot pumpwells at the rear of the structure. Installed in each pumpwell will be two 50 percent capacity circulating water pumps (two 70,000 gpm (100.8 mgd) and two 79,000 gpm (110.6 mgd) respectively). One set of pumps will provide cooling water to unit 3 and the other set of pumps will provide the cooling water for Unit 7. The intake will consist of a series of parallel separation walls forming 16 flow chambers. Each chamber will have a trash rack stop log (used to isolate a chamber for maintenance), and a fish screen. The intake structure has been sized to keep the intake flow below a maximum of 0.4 feet per second. The fish screen is intended to prevent fish and other aquatic organisms from becoming entrained in the cooling water and passing through the condenser system. The screen mesh will be a smooth wire with openings no larger than 5/32 inches. The screens are vertical and will rotate through a two stage cleaning section where any organisms and debris that adhere to the screen are washed off with water sprays. Fish and other aquatic organisms are washed off and returned to the bay while debris is collected and disposed (Mirant2001I).

#### **Cooling Water Discharge**

Mirant is proposing to discharge the cooling water from the new Unit 7, as well as the existing Unit 3, back to San Francisco Bay using four parallel multiport diffusers. The cooling water flowrates for Units 3 and 7 are respectively 153,000 and 158,000 gpm (220 mgd and 227 mgd), including service water. The temperature rise is estimated to

be 20°F. Thus, the combined waste heat loading of the existing Unit 3 and proposed Unit 7 will be double the current Unit 3 loading to San Francisco Bay.

A new multiport diffuser design has been proposed by Mirant, changing the design specified in the AFC. The new design would consist of two 200-ft long diffusers at the terminal ends of a 900-foot discharge pipe. There would be two of these discharge pipes, one for each of Units 3 and 7, in depths of 20 to 28 ft below MLLW (Mirant 2001k). These diffusers will provide better dilution of the thermal effluent with ambient waters than the existing Unit 3 discharge, however, as mentioned above, the waste heat load is doubled.

## **ENVIRONMENTAL IMPACTS**

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### **DIRECT AND INDIRECT PROJECT-RELATED IMPACTS**

#### **Water Quality**

Wastewater discharges to the sewer from the power plant must comply with the limits set forth in San Francisco Municipal Code, Article 4.1. Any grab sample of the discharger's wastewater shall not at any time exceed any of the following numerical limitations:

<u>POLLUTANT PARAMETER</u>	<u>LIMITS</u>
• pH	6.0 min; 9.5 max
• Dissolved sulfides	0.5 mg/l
• Temperature	125°F
• Hydrocarbon oil and grease	100 mg/l

Any composite sample representative of the total discharge of the wastewater generated over a production week shall not exceed the following numerical limitation:

<u>POLLUTANT PARAMETER</u>	<u>LIMIT</u>
• Total recoverable oil and grease	300 mg/l

Prior to the point of introduction to any City wastewater treatment plant, the temperature of the influent may not exceed 104°F.

The applicant has recognized this requirement for Unit 7 in the AFC and has provided the chemistry from existing Unit 3 discharges to the sewer (SECAL 2000a). It is expected that Unit 7 discharges to the sewer will be similar to those of Unit 3 and therefore in compliance with forthcoming permit conditions. Wastewater discharges to the sewer from Unit 7 are not expected to cause any significant adverse effects on the environment or operations of the CCSF sewage system if the proposed mitigation is implemented and the proposed Conditions of Certification are required.



## Construction Dewatering

During excavation of soils and some construction activities, groundwater may be encountered. This water must be pumped away to allow construction activities to commence. This pumping is called dewatering. Groundwater dewatering will be required for certain phases of construction. This will occur both during installation of the cooling water intake and discharge conduits and on-site construction. Hydraulic testing of the aquifer is still needed to estimate the required dewatering flowrates. At the site, due to its proximity to the Bay, high dewatering flowrates are expected. This water would also be required to meet the conditions set forth in San Francisco Municipal Code, Article 4.1, as discussed above.

Dewatered groundwater can be disposed of by several means including on-site infiltration in trenches, discharge to San Francisco Bay, or discharge to the municipal sewer system. Each of these alternatives requires specific approval and suitable water quality. Appendix D within the AFC contains a water quality analysis of the groundwater that would be expected to be discharged into the sewer CCSF sewer system. While groundwater contamination was found in several locations at the site, the analysis indicates that essentially no exceedance of San Francisco Bay Batch Wastewater Discharge Limits occur in the areas to be dewatered. Therefore, disposal of dewatering groundwater will not cause significant impacts. Nevertheless, while several disposal means are discussed in the AFC, no specific plan is mentioned in the Site Mitigation and Implementation Plan (SECAL 2000a - Appendix D). Condition of Certification **SOIL & WATER-3** requires that a dewatering disposal plan be prepared and approved prior to initiation of site mobilization for construction activities.

During construction in off-shore areas, areas which would normally be aquatic habitats will be deprived of essential water and will be exposed to disturbance from construction activities. While the silt curtain/cofferdam system is in place, local currents may be affected and altered. The effects of these impacts are discussed in the **Aquatic Biological Resources** section of this FSA.

## Thermal Discharge

The applicant modeled the once-through cooling water thermal discharge effects on the receiving water (San Francisco Bay). The results of the modeling and compliance with NPDES requirements are discussed below.

On August 2, 2001, Mirant submitted a report titled *Cooling Water System Improvements and Thermal Impacts Evaluation* ("thermal report"). The thermal report describes the Unit 3 and Unit 7 cooling water systems and estimates the dispersion of the thermal plumes under future operating conditions. A computer modeling of the new discharges in different tidal conditions was conducted using conservative factors including maximum condenser heat loading, and no surface heat loss.

The result of the computer modeling indicates that with a change of temperature ( $\Delta T$ ) of 20°F at point of discharge, the thermal plumes are dispersed through vertical columns and the cumulative maximum increase in water temperature at the end of the zone of initial dilution will be less than 4°F. The maximum increase in surface water temperature is also predicted to be less than 4°F. The applicant predicts no shoreline

or bottom contact by waters with a  $\Delta T$  greater than 4°F. The result of this computer modeling was used to evaluate Mirant's request for an exception to the Thermal Plan's  $\Delta T$  4°F thermal waste discharge limitation.

Thermal analysis predictions were developed using the UM3 model, a component of the USEPA PLUMES software package. The applicability of the UM3 model for this application was supported by scale model tests conducted at Georgia Tech. However, there are several issues with this model and the manner it was applied, which lead to questions as to the validity of the predictions.

Mirant indicates that "*the individual diffuser ports will be oriented in an offshore direction...*" (Mirant, 2001k, p.1), but there is no specification of the angle in the text or drawings. The modeling does not appear to include any offshore angle.

The methodology used to simulate the cumulative effect of the four parallel diffusers does not represent actual conditions. In the UM3 computer model, discharge was assumed to be all in the same direction. For the proposed alternating design, at slack tide, the plume from one side of one diffuser will collide head on with that from the other side of the adjacent diffuser. This collision will occur half way between the two diffusers, at a point where the scale model shows the plume from a single diffuser occupies essentially the full depth. This will result in backflow towards the diffuser, lateral spreading and probably recirculation. These phenomena are not accounted for in the simplified modeling approach used.

The plume thickness calculated by the UM3 model is 1/2 to 1/3 of that observed in the scale model. This factor is important because the plume thickness plays a significant role in the superposition technique used to simulate the 4 parallel diffusers.

The methodology used to account for the effect of tidal heat return predicts that no additional temperature rise would occur. Tidal current reversals bring previously discharged heat back to the diffuser area, and this can have an impact on the system. The fact that the model indicates no additional temperature rise is another indication that the methodology used to superimpose different sources is flawed.

The scale model gives estimates of the nearfield dilution that compare well with the UM3 model. However, it is not clear whether this corresponds to a sustained condition, and whether the laser-based estimates of dilution were calibrated. Further, the scale model indicates that, at least near the center of the diffuser, the plume essentially occupies the full water depth, which would make the UM3 model inapplicable. Thus, the validity of the scale model confirmation of the UM3 model is uncertain.

The modeling presented by Mirant concluded that the surface temperature rise would not exceed 4°F. Given the above comments on the model, the validity of this conclusion is in doubt. The main reason is the interaction of the plumes from the different diffusers, which discharge into one another. A set of diffusers of the same length as proposed, but with nozzles oriented offshore ("staged" configuration) could possibly achieve the 4°F requirement, however, this has not been proposed by the

applicant. Staff's recommendation of an upland alternative cooling system would avoid any adverse impacts from the proposed project's thermal discharges.

The 4°F temperature rise discussed above would occur at and soon after slack tide. During other parts of the tide cycle, when the ambient current is higher, induced temperature rises would be smaller.

**SOIL AND WATER RESOURCES TABLE 3**  
**Induced Temperature Rises at Higher Current Speeds**

Current Speed (Knots)	0.5	1	1.5	2
Current Speed (ft/sec)	0.84	1.69	2.53	3.38
Time Current Speed Exceeded	87%	73%	57%	37%
Temperature rise (°F)	3.3	1.8	1.2	0.9

The California Thermal Plan provides that with the concurrence from the SWRCB, RWQCBs may grant exceptions to the Specific Water Quality Objectives of the Thermal Plan in accordance with Clean Water Act Section 316(a) (33 U.S.C. Section 1326) and applicable federal regulations. The discharger has requested the SFRWQCB to consider and grant an exception to the  $\Delta T$  4°F requirement for wastewater discharge.

Clean Water Act Section 316(a) provides that an exception will be granted if the discharger can demonstrate, to the satisfaction of the SFRWQCB, that an effluent limitation for heat is more stringent than necessary to assure the protection and propagation of a balanced, indigenous population of shellfish, fish and wildlife in and on the body of water into which the discharge is to be made. If the exception is granted, the SFRWQCB will adopt an alternate effluent limitation, taking into account the interaction of the heat component of the discharge with other pollutants that will protect the receiving water.

The SFRWQCB issued a Tentative Order that grants the Discharger's request for exemption from the  $\Delta T$  4°F requirement. This Order specified an alternative effluent limitation of  $\Delta T$  20°F for the thermal discharges (E-001, E-002) from the expanded power plant. This alternative effluent limitation is effective upon approval by the SFRWQCB. However, this Order was pulled from Board consideration due to concerns regarding the thermal discharge raised by CDFG and NMFS. No timetable has been set for reconsideration.

Due to uncertainties inherent in any the computer model, the Order requires the discharger to determine the actual dispersion of the thermal plumes under operating conditions and the effects it has on the surrounding biota. Based on the result of the study, the SFRWQCB may amend the permit to modify the temperature exemption or remove the exemption altogether.

### ***Biofouling Treatment***

The effects of thermal treatment to reduce biofouling are still being investigated to determine what happens to the slug of heated water that is recirculated when it is discharged back out through the outfall. This slug of heated water would be of short

duration, but may exceed the permit temperature requirements. The possibility of releasing this heated water slowly in conjunction with normal discharge from Unit 3 is being investigated, however, staff's recommendation of an upland alternative cooling system would avoid all impacts associated with thermal treatment discharge.

## **Intake/Discharge Structure Construction**

### **Structure Location and Description**

The findings of the Final Offshore Sediment Characterization Report indicated elevated levels of contaminated sediments at the original proposed intake location (Northeast portion of the site). The applicant has relocated the Unit 3 and Unit 7 cooling water intake structure and adjusted the configuration of the discharge structures to avoid those contaminated sediments in the location originally proposed in the AFC. The intake structure will be located between the Unit 3 and Unit 7 diffusers.

The originally proposed locations for the discharge structures remain the same. The Unit 3 location consists of two 54" pipes that will extend approximately 900 feet bayward from the existing Unit 3 discharge location with the diffusers making up the last 200 feet. The Unit 7 discharge structures would consist of the same dimensions as the Unit 3 pipes; however these pipes would be located approximately 200 feet south of the Unit 3 structures (Mirant2001e). The separation between the Unit 3 diffuser sections and the Unit 7 diffuser sections averages approximately 200 feet (Mirant2000g).

### **Structure Construction**

#### ***Intake Construction***

Prior to excavation for the intake structure, the applicant will employ BMPs that will consist of a silt curtain and cofferdam system. The anchored silt curtain would serve to retain any sediment that may become suspended during the installation of the cofferdam. The cofferdam would consist of sheet pile that would be embedded to bedrock in a rectangular formation. Water within the cofferdam would then be pumped into the bay to allow for dry working conditions during the installation of the intake structure. Any suspended sediments within the cofferdam area would be allowed to settle and/or treated with flocculants, which would reduce impacts to the bay during the pumping process (SEP2001Dresp3, Data Response No. 165). The applicant indicates that a similar preconstruction methodology would be followed for the construction of the Unit 3 and Unit 7 discharge structures.

Total dredging required for the front of the intake structure would be approximately 5,900 yd<sup>3</sup> that would encompass approximately 27,750 square feet. Construction within the cofferdam would involve excavation for the concrete base, intake structure, screens, and other facility-related parts. Drawings that depict the aforementioned construction process have been provided as part of the applicant's Consolidated Dredging – Dredged Material Reuse/Disposal Application. All dredged material will be hauled offsite to the Altamont Landfill and Resource (MIRANT2001DMMOApp).

Approximately 4,050 yd<sup>3</sup> of material would need to be dredged for the intake approach area. Because of the potential for contaminated material to become exposed, the

applicant proposes to construct an engineering cap that would cover the intake approach area. The cap's thickness is expected to be approximately 3 feet; however, the applicant needs to conduct chemical isolation modeling to determine the final design thickness of the proposed cap (Mirant 2001Dresp6, Data Response No. 201). The Bay fill related to the intake structure would be approximately 10,300 square feet (BCDC 2001x).

### ***Discharge Construction***

The discharge structures for Units 3 and 7 would be placed on the surface of the bay and be anchored by a marine mattress. The first several feet of the discharge structures beyond the existing ground surface would consist of backfill material. The bayward sloped portion of the backfill would be stabilized via rip-rap (rock). Beneath the rip-rap would be the marine mattress, pipes and gravel fill, respectively. In order to prevent structural failure and turbidity during pipe placement, soil stabilization fabric would be placed on the bay bottom where the structures would be located. The applicant has indicated that no dredging would be required for the Unit 7 discharge structure and approximately 200 yd<sup>3</sup> of material would be dredged at the nearshore portion Unit 3 discharge structure. Dredging operations and the Units 3 and 7 structures would create approximately 183,650 square feet of fill in the Bay (BCDC 2001x). Construction equipment to be used would include but not be limited to: barges, a crane, hauling vehicles, excavator, tugboat and a pile driver. The anticipated construction time frame would range from approximately 18-24 months with intermittent breaks due to biological issues (SEP2001Dres1, Data Response No. 19).

The applicant has indicated that the silt curtain is not intended to trap waterborne contaminants, but that the threat of free floating hydrocarbons would be low due to dense tar like residue that currently exists at the site (Mirant2001DResSAEJ1, Data Response Nos. 138-140). The applicant also indicates that any potential permanently exposed sediment would be dealt with by using cofferdams and engineered caps (Mirant2001DResSAEJ2, Data Response No. 196). In the event of an oil sheen, an oil boom will be placed inside the silt curtain to contain the sheen. The applicant proposes the following additional measures: an extensive monitoring program that includes the contingency measures designed to contain the contaminated sediment until capping is completed; and consulting with the SFRWQCB to develop an additional sampling and analysis plan to verify if additional water quality measures are needed (Mirant 2001 DResp6, Data Response No. 195).

### **Intake Structure Design**

Section 316(b) of the Clean Water Act (33 U.S.C. Section 1326(b)) requires that the location, design, construction, and capacity of cooling water intake structures reflect Best Technology Available (BTA) for minimizing adverse environmental impacts.

The impact of the Discharger's intake cooling water system is a function of the number of organisms entrained (drawn into the cooling water system) and impinged (forced against the intake screens). Please refer to the **Aquatic Biological Resources** section of this FSA for more information.

In order to provide current and relevant 316(b) data, Mirant is currently conducting a 316(b) study to predict the impacts of the new cooling water intake on aquatic life. One year of data collection will be completed in mid-winter 2002. The study was designed to provide additional information on organisms that may be entrained in the cooling water system. Impingement is not being addressed as the new intake structure is designed to significantly reduce the number of organisms impinged by lowering intake velocities and reducing the amount of debris that might entangle fish. Impingement studies of the existing facility would therefore not be representative of the new facility until the new facility was operating.

The tentative NPDES order released by the SFRWQCB included a provision requiring the discharger to conduct impingement studies upon startup of the new facility. If the result of the impingement studies concludes that there are adverse impacts from the new intake structure, the project owner would be required to implement BTA. According to the Clean Water Act, if the cost of implementing any alternative for achieving BTA is wholly disproportionate to the environmental benefits to be achieved, the SFRWQCB may consider alternative methods to mitigate these adverse environmental impacts.

Under the California Environmental Quality Act (CEQA), if significant impingement impacts result, the project could be required to use an alternative cooling technology. Staff is considering alternative cooling technologies that would avoid the very possibility of this impact occurring. For more information regarding 316(b) issues, please refer to the **Aquatic Biological Resources** section of this FSA.

## **Soil Erosion and Sedimentation**

### **Power Plant Construction and Operation**

Accelerated wind and water-induced erosion may result from earthmoving activities associated with construction of the proposed project. Activities that expose and disturb the soil leave soil particles vulnerable to detachment by wind and water. Most of the annual precipitation in the San Francisco area is contributed during the mild, wet winters. Prolonged periods of precipitation, or high intensity and short duration runoff events coupled with earth disturbance activities can potentially enhance on-site erosion eventually resulting in increased sediment load within nearby receiving waters. To eliminate these impacts, a Storm Water Pollution Prevention Plan (SWPPP) and erosion and sedimentation control measures are required by Condition of Certification **SOIL & WATER-1**.

The applicant has indicated that the soil sensitivity related to erosion within the proposed Potrero PP facility is low (SECAL 2000a). However, all soils are highly susceptible to erosion upon removal of any vegetative, asphalt, or gravel cover and the commencement of earthmoving activities.

The proposed Unit 7 facility would affect approximately 6.5 acres within the approximate 20-acre site. The total volume of soil to be excavated for the entire project would be approximately 39,600 cubic yards (cys) (Mirant2001DRespCBE, Data Response No. 15). The grading procedure will occur as a mass excavation bringing the plant area to an approximate elevation of 20 feet MSL. The main plant area will be excavated to a

depth of approximately 6 feet (SECAL 2000a). The applicant has indicated that earth disturbance would not be necessary for construction parking, trailers, and laydown areas because the areas would remain paved (Mirant 2001Dresp6, Data Response No. 208). Excess soil not suitable as backfill will be delivered to an off-site disposal area. The applicant has not identified amounts of excess fill material or locations; however, that information will be required prior to site mobilization in **SOIL & WATER-1**.

Offshore dredging will be necessary for the installation of the intake structure that will service Units 3 and 7 and is discussed in the **Intake/Discharge Structure Construction** discussion below. The applicant has not provided any drawings depicting the locations of Best Management Practices (BMP) to be implemented for erosion and sedimentation control. Refer to the **Mitigation** and **Conclusions and Recommendations** discussions below for further discussion on Erosion and Sedimentation.

### **Stormwater Runoff**

There will be no change in impervious area or runoff within the existing 6.5 acres where Unit 7 will be constructed; therefore, stormwater runoff will not change with the addition of Unit 7. Stormwater runoff will be directed to existing catch basins and, following inspection, directed into the San Francisco Bay via outfalls E-003 to E-005 and/or to oil water separators then into the city sewer system (SECAL 2000b).

Stormwater runoff that does not discharge directly into the San Francisco Bay will need to pass through an oil/water separator prior to being discharged to the city sewer system. The oil/water separator system is used to collect and process oil-laden stormwater. The water separated from the oil is directed into the city sewer system and the oil is pumped into a 2,000-gallon sludge oil tank then transported for off-site recycling. Specific areas of the Unit 7 facility where stormwater runoff will be directed to an oil/water separator include the Fuel Tank Farm and Power Generation Area. The Switchyard area directs flow into a retention pond then releases the stormwater to city storm drains. The Non-Operational Area and Customer Energy Services/Safety, Health and Claims Area direct flows to the city sewer system. The Power Generation and Operations Area is equipped with a valve system that allows for a visual inspection of the stormwater prior to discharge. If oil is detected in the stormwater, then the flow is directed to the oil/water separator system (SECAL 2000b).

The applicant has indicated that the existing storm sewer system will be capable of handling the runoff from Unit 7 due to no change in impervious area. Calculations have been provided for the catch basin and outfall systems E-003, E-004, and E-001. Pipeline information was not available for Outfall E-005 and the Unit 7 area (Mirant 2001c). This information will be required prior to site mobilization activities by **SOIL & WATER-1**.

### **Pipeline Construction and Operation**

Temporary and permanent disturbances related to construction of linear facilities (pipelines) are expected to occur within the existing Potrero PP site. The gas pipeline for Unit 7 will connect to the existing 36-inch line. The line enters the Potrero PP on the

south side of the site. The proposed 16" natural gas pipeline would be installed across slopes ranging from 0 to 5 percent (SECAL 2000a).

Potable water for Unit 7 will be supplied via the existing on-site water line. Potable water to the site is supplied by CCSF, which in turn is supplied through the Hetch Hetchy Water and Power System (HHWP) (SECAL 2000b). The applicant has not identified locations, sizes or lengths of proposed water supply pipelines that will interconnect with the existing Potrero PP site; however, more specific information will be required as part of **SOIL & WATER-1**.

### **Transmission Facilities**

Transmission line placement beneath streets and abandoned rail right-of-ways will be accomplished via a direct burial process. The direct burial process would consist of 6'X6' trenches excavated in six 1,500-foot lengths. This activity would traverse slopes ranging from 0 to 2 percent. The Orthents soil type consists of soil, gravel, concrete and asphalt rubble, solid wastes and Bay Mud (SECAL 2000a). In order to minimize soil disturbance and traffic congestion, no more than two trench excavations will be active at one time. During construction, clean material will be placed along side the trenches and all excavated material will be immediately removed from the site. Upon installing the transmission line, the trenches will be immediately covered with backfill. The total amount of excavation for in-street and rail-right-of ways will be approximately 7,833 cubic yards (cys). The applicant has not identified stockpile storage or disposal areas, but has identified the construction laydown area as a possible location. Particular care will be required regarding the amount of open trench at any given time and the proximity of stormwater inlets. For more information regarding provisions and requirements associated with transmission line construction within roadways, please refer to the **Mitigation** discussion below. (SECAL 2000a).

Because this activity involves over 50 cubic yards of excavation, the applicant must provide a site history that involves soil sampling and analysis as required by the Maher Ordinance (refer to the **LORS** discussion above under "San Francisco Public Health Code" for more information on the Maher Ordinance). In the event that hazardous soils are encountered, a site mitigation report must be prepared and the soils disposed of at an appropriately licensed hazardous materials disposal site (SECAL 2000a). Refer to the **Waste Management** section for further discussion.

The applicant has noted that earth disturbance for the transmission line construction will require direct boring under Islais Creek. The total bore distance will be approximately 850 feet. The disturbance on the side of the drill rig will be to an area 50 feet wide by 150 feet long and 10 feet deep. This assumed depth is for the bore entry point. Two 30-inch high-density polyethylene (HDPE) pipes will be installed under the watercourse. The pipe insertion side of the bore area will disturb an area approximately 25 feet by 50 feet. The depth of the bore beneath Islais Creek will range from approximately 20 to 30 feet below the bottom of the watercourse. One component used along with machinery is bentonite clay. The clay, mixed with water from the creek, will provide a slurry used to power the cutting head of the drill and will provide stabilization within the hole to prevent a collapse. During this type of boring, fractures or cracks can occur between the bore and the streambed. This is called a "frac-out" and can result in bentonite being



released into the stream. The applicant indicates that frac-out impacts would be minimized by locating the boring through bay mud materials, obtaining geotechnical information, and pressure control of the drilling fluid (SEP 2001Dresp3, Data Response No. 167). Staff provisions regarding direct boring are provided in the **Mitigation** discussion below and in **SOIL & WATER-4**.

### **Station A Demolition**

Prior to construction of the proposed Unit 7 facilities, five abandoned structures referred to as the Station A Complex will be demolished. A nearby metal shop building will also be demolished. All debris will be contained within the respective demolition areas before being recycled on-site or transported to off-site disposal areas and/or recycling facilities.

Fugitive dust can result during the demolition of the buildings. Excessive dust, coupled with runoff from a precipitation event, can enter storm drain inlets and pose water quality problems within a receiving watercourse. The applicant has indicated that all demolition debris will be sprayed with water to reduce airborne dust and onsite inlets will be protected to control contaminated runoff (SECAL 2001a).

### **Roads**

Direct access to the site would be via Illinois Avenue and 23<sup>rd</sup> Streets. Proposed on-site access roads would be constructed around the power block area and between the existing Communications Building and the proposed Cooling Water Intake Tunnel to intersect with B Street (SECAL 2000a, Figures 2-2 & 2-9). The Applicant indicates that all proposed roads would be stabilized with pavement or gravel (Mirant 2001Dresp6, Data Response No. 207).

### **Soils Excavation**

Construction of the project will entail excavation of contaminated soils. The applicant prepared a Site Mitigation and Implementation Plan (SECAL 2000a - Appendix D) that discusses options for handling contaminated soils. These options include on-site reuse and off-site disposal. On-site reuse is contingent on acceptable risk to construction workers or future industrial workers, and must be approved by appropriate agencies (SFRWQCB, DTSC and/or San Francisco Department of Public Health (SFDPH)). Refer to the **Waste Management** and **Worker Safety** sections of this FSA for more information regarding these issues. Off-site disposal will depend on the degree of contamination. The Site Mitigation and Implementation Plan does not include actual disposal plans, or testing procedures to be implemented to guide the disposal process. The applicant has provided a proposed sampling and analysis plan and indicated that supplemental information will be made prior to the start of construction. Staff recommends that this plan must be approved by the Energy Commission Compliance Project Manager (CPM) prior to site mobilization (see **SOIL & WATER-3**). Excavated soil will be stored onsite and, depending on profile results, either reused or disposed of at an appropriately licensed disposal facility. Refer to the **Waste Management** section of this FSA for further discussion.

## **Cooling Water Alternatives**

The following is a brief discussion assessing cooling water alternatives. Please refer to Staff's Cooling Options Study, Appendix to the **Aquatic Biological Resources** section for more information.

SWRCB Policy 75-58, which considers only water supply issues, states that the source of power plant cooling water should come from the following sources in order of priority:

1. Wastewater being discharged to the ocean
2. Ocean water (staff does not consider S.F. Bay water to be ocean water)
3. Brackish water from natural sources or irrigation returns flow
4. Inland wastewaters of low total dissolved solids
5. Other inland waters

The Unit 7 project proposes to use San Francisco Bay water, which raises aquatic biological resources concerns. Staff believes that using an upland cooling alternative to Bay/estuary water would be beneficial. Therefore, the use of reclaimed water (treated wastewater) and/or dry cooling is recommended. The use of wastewater as a source for cooling Unit 7 would require the construction of a wet cooling tower (closed-cycle) system as part of a wet or hybrid (wet/dry) cooling water system. Wet cooling towers act as heat exchangers, taking water that is used to condense steam from the steam turbine cycle in the surface condenser, and exposing it to the air to remove the heat that has been absorbed. A portion of the water is evaporated in the cooling process and the remainder is collected and recycled back to the steam condenser.

The use of wet cooling towers as part of a hybrid system, rather than a once through cooling system that uses water from the San Francisco Bay/estuary, would require make-up water to replace that lost through evaporation. In a wet or hybrid cooling system, water is evaporated from the cooling tower, the minerals in the water concentrate and form scale that inhibits the operation of the cooling tower. To control the water quality of the cooling tower a portion of the water is expelled as blowdown and is normally replaced with make-up water. The make-up water would be reclaimed water from a wastewater treatment facility. Using reclaimed wastewater as make-up supply is preferred over San Francisco Bay/estuary water or fresh water.

As mentioned above, as water is evaporated from these systems, the remaining water increases in mineral concentration, requiring make-up supply. The amount of water needed for closed-cycle cooling systems is dependent on the quality of the water. Using reclaimed water, the requirements of the plant would range between 2.9 and 4.4 million gallons per day (mgd). Effluent or blowdown from the cooling towers would be returned to the wastewater treatment plant either through the sewer system or through a dedicated pipeline. The City and County of San Francisco's Southeast Water Pollution Control Plant (SWPCP) would most likely provide reclaimed water. The effluent from the water treatment plant is currently treated to secondary standards and would require further treatment to be used in a cooling tower application. This plant is located approximately 1.2 miles from the Potrero PP site and would require a new pipeline for delivery of the cooling tower make-up water.

During a study in 2000, Dioxin was found in the SWPCP effluent. The USEPA water quality standard is 0.014 picograms/liter (pg/L) or 0.014 parts per trillion. The dry-weather secondary effluent had levels under 0.028 pg/L, and the wet-weather secondary effluent had concentrations of 0.4 pg/L. The higher levels of wet-weather effluent can be attributed to the blending of the SWPCP primary-treated effluent and secondary-treated effluent during wet-weather periods (Huang, 2002). The source of this dioxin is primarily stormwater and municipal wastes. The Unit 7 project would discharge its cooling water waste back to the treatment plant, which would then discharge that waste into the Bay as part of its normal operations. Because the Unit 7 project would not add any additional dioxin to its wastewater as part of a closed-cycle cooling system, and because the same quantity of dioxin would be discharged to the Bay by the treatment plant regardless of the project, the project would not contribute to these elevated levels of dioxins entering the Bay.

## **CUMULATIVE IMPACTS**

### **Cooling Water Discharge**

The following discharges occur near the Potrero plant: (1) San Francisco Drydock, Inc (NPDES Permit CA0005321) about 1,500 ft north of the site; (2) San Francisco Southeast Sewer Plant, (NDPES permit CA00037664), about 2,500 ft south of the site; and (3) San Francisco Southeast Sewer Discharge at the Quint Street Outfall (NPDES permit CA0037664), about 2,800 ft up Islais Creek from the Bay. These discharges are wastewater discharges, which will tend to flow along the shore and may interact with the cooling water plume. The project's cooling water plume could possibly contribute to cumulative thermal impacts, but these impacts are expected to be minimal.. However, staff recommends an upland cooling alternative to the proposed once-through cooling technology to avoid the possibility of cumulative thermal impacts to the Bay.

### **Erosion and Sedimentation**

Construction and operational activities related to the Unit 7 project may cause accelerated wind and water erosion. However, implementation of the proposed mitigation measures, the SWPPP, and the Erosion and Sediment Control plan (also part of the NPDES requirements) would ensure that Unit 7 would not contribute to cumulative erosion and potential sedimentation impacts related to nearby projects.

### **Bay Fill**

The SFRWQCB's Basin Plan states "...the Bay system's deepwater channels, tidelands, marshlands, freshwater streams, and rivers provide a wide variety of habitats that have become increasingly vital to the survival of several plant and animal species as other estuaries are reduced in size or lost to development. These areas sustain rich communities of crabs, clams, fish, birds, and other aquatic life and serve both as important wintering sites for migrating waterfowl and as spawning areas for anadromous fish" (CRWQCB 1995). See the **Aquatic Biological Resources** section of this FSA for further discussion of these significant resources.

The Unit 7 project would create approximately 194,000 square feet of new fill in the San Francisco Bay, resulting from the intake and discharge structures associated with the proposed once-through cooling system. The Bay is a unique and diverse body of water with many beneficial uses. The Bay's various habitats and physical characteristics are

being altered and lost due to new development in the Bay. The cumulative effect of further development in the Bay will reduce its productivity and diversity even further. Staff recommends the use of an upland alternative cooling technology, thereby eliminating further impacts to the Bay. Please refer to the **Aquatic Biological Resources** section of this FSA for more information on this issue.

## ENVIRONMENTAL JUSTICE

Staff has reviewed Census 2000 information that shows the minority population is greater than fifty percent within a six-mile radius of the proposed Potrero Power Plant Unit 7 Project (refer to the **Socioeconomics** section **Figure 1** in this FSA), and Census 1990 information that shows the low-income population is less than fifty percent within the same radius. Based on the **Soil and Water Resources** analysis and staff's resulting recommendations for the project, staff recommends an upland cooling alternative that will not result in unmitigated significant direct or cumulative soil and water resources impacts from construction or operation of the project. Therefore, there are no soil and water-related environmental justice issues regarding this project.

## MITIGATION

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### APPLICANT'S PROPOSED MITIGATION

#### Cooling Water Intake

The applicant proposes the following cooling water intake structure design aspects to mitigate cooling water intake associated biological resource losses (SECAL 2000a):

- design approach velocity of 0.4 fps
- effective screen opening of 5/32" (4.0mm) with wedge wire screen
- the use of fish screens
- the use of a screen wash system to return biological organisms

Staff believes that these measures will not be sufficient to mitigate all biological resources impacts. Therefore, staff is recommending an upland cooling alternative to mitigate impacts to the San Francisco Bay/estuary and its resources. Please refer to the **Aquatic Biological Resources** section of this FSA for more information.

#### Erosion and Sediment Control

The applicant has provided a draft Stormwater Pollution Prevention Plan (SWPPP) that identifies erosion/sedimentation and stormwater Best Management Practices (BMPs).

In the AFC and draft SWPPP, the applicant proposes a number of BMPs to be implemented during the construction and operation of Unit 7 and associated linear facilities (SECAL 2000a, SECAL 2000b, Mirant 2001c, Mirant 2001k, MIRANT2001Dresp6,, Data Response Nos. 208 & 209). They include:

- Temporary and permanent vegetation strategies.
- Utilize soil stabilizers (i.e. water) as appropriate to minimize dust.

- The use of geotextiles and mats to stabilize slopes.
- Storm drain inlet protection to prevent sediment-laden runoff from entering inlets or catch basins.
- Utilize silt fence or straw bale barriers to trap sediment.
- The use of berms or ditches to convey runoff.
- Directing sediment-laden runoff into a temporary sediment basin.
- Secondary containment for hazardous material delivery and storage areas to prevent spills or leakage of liquid materials from contaminating soil or soaking into the ground.
- Specific BMPs for upland pipeline construction.
- Designated storage areas for construction wastes, hazardous materials, paints, and related products along with covered dumpsters and containers for waste and recyclables.
- Training of employees on stormwater quality management.
- Implementation of a spill prevention and control plan.
- Timely removal of construction wastes.
- Storage of all liquid wastes in covered containers.
- Emergency spill containment kits and materials in areas of potential hazardous materials release.
- Routine maintenance of the oil/water separator system.
- Management of contaminated excavated materials via a Site Mitigation and Implementation Plan (SMIP).
- Covering soil stockpiles for protection during a rainfall event.
- Cofferdams and silt curtains to be utilized during dredging events.
- Maintenance of intake and outfall structures conducted in accordance with the U.S. Army Corps of Engineers dredging permit.

## **STAFF'S PROPOSED MITIGATION**

In addition to the applicant's proposed mitigation measures, staff recommends the following mitigation measures be required for the Potrero PP Unit 7 project.

### **Wastewater Discharge**

The applicant will must provide all information required to satisfy the requirements that pertain to an Industrial Wastewater Discharge Permit from the San Francisco Public Utilities Commission Bureau of Environmental Regulation and Management (BERM). This includes drawings showing locations of discharge, information on wastewater treatment, and a schematic overview of the facility that will generate the wastewater must be submitted.

## **Soil Contamination**

The proposed Unit 7 project entails the excavation of over 50 cubic yards of contaminated soil bayward of the historic shoreline. Staff is requiring the applicant to prepare a Site Mitigation and Implementation Plan (SMIP) that addresses the issues required by Article 22A of the City and County of San Francisco's Public Health Code. Please see **SOIL & WATER-3**. The SMIP shall provide descriptions of site conditions, on-site environmental investigations, approximate amounts of soil and groundwater volumes generated during construction, excavation and material handling procedures, and additional sampling methods for soil and groundwater (SECAL 2000a). Please refer to the **Waste Management** section of the FSA for further discussion.

## **Erosion and Sedimentation Control**

The applicant shall provide complete Erosion and Sediment Control and Stormwater Management plans to accompany the narrative portion of the SWPPP. These plans shall include the following:

- Proposed contours shall be shown tying in with existing ones. All proposed utilities including stormwater facilities should be shown on the plan's drawings. All erosion and sedimentation control facilities shall be displayed on drawings. The drawings should contain a complete mapping symbols legend. This legend should identify all existing and proposed features including a limit of construction boundary. The limit of construction boundary shall include the project facility, pipeline areas, onsite road systems, stockpile areas, transmission line areas and laydown areas. The limit of construction ensures that work is confined to the entire proposed Unit 7 project in order to protect all surrounding areas.
- The erosion and sediment control plan as part of the Final SWPPP must include drawings that depict BMPs for the transmission line installation and any stockpile storage and laydown areas associated with this activity.
- Transmission line excavation within roadways shall be limited to an area that can be excavated and backfilled within a day. Exposed soil shall be stabilized upon backfilling the open trench. Spoil material shall not be located near any stormwater inlets and shall be hauled offsite to an approved disposal area.
- Silt fence, haybales and sandbags should be used to trap sediment, not as runoff conveyance facilities. Berms or channels shall be used to intercept sediment-laden runoff and direct it into the proposed sediment basin.
- All excavated material from the boring under Islais Creek should be kept away from and out of the waterbody. The soil should be covered with a liner or anchored mulch. Areas disturbed during the process should be stabilized via permanent native vegetation upon completion of the process. Proper storage and use measures for the drilling mud must be described in the SWPPP.
- A plan for dewatering, in the event groundwater is contacted during excavation activities.
- Stormwater inlet protection during construction.
- Water Quality analysis as part of the stormwater monitoring program to include testing for pollutants other than just petroleum based ones.

- Stormwater calculations for the retention basin, sediment basin and related stormwater facilities (pipes, etc.).

### **Alternative Cooling Technologies**

Staff recommends the use of an upland alternative cooling technology to avoid direct and cumulative impacts of the proposed once-through cooling system and to ensure compliance with LORS.

## **COMPLIANCE WITH LAWS, ORDINANCES, REGULATIONS AND STANDARDS (LORS)**

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### **FEDERAL**

#### **Clean Water Act**

USEPA has released new draft regulations for Section 316(b). The new regulations will become effective 30 days after they have been published in the Federal Register. Based on a letter docketed December 6, 2001, the USEPA Region IX determined that the Unit 7 project will be considered both a “new facility” and a “new source”, and as such, will be subject to the new regulations. However, USEPA Headquarters provided Region IX with a letter that rescinds that determination, stating that the Unit 7 project is not a “new facility” under the new regulations, and therefore would not be subject to the new 316(b) regulations. Provisions for Section 316(b) regulations will be set forth in the NPDES permit, however, it remains unclear as to when and how this issue will be definitively resolved. Please refer to the **Aquatic Biological Resources** section of this FSA for more information.

On August 16, 2001 the San Francisco Bay Regional Water Quality Control Board issued a Tentative Order and Tentative Self-Monitoring Program for Mirant Potrero LLC – Potrero Power Plant (NPDES Permit Reissuance). The Regional Board intended to consider the reissuance of the NPDES permit during a meeting in November 2001. However, in October 2001, the Regional Board pulled the draft NPDES permit from Board consideration due to concerns raised by CDFG and NMFS. Please see the **Aquatic Biological Resources** section of this FSA for more information on biological resource concerns. There has been no timetable set for the issuance of a revised draft permit, as SFRWQCB staff is awaiting input from those agencies, and is requiring more information for submittal by the applicant. Without this draft permit, staff cannot determine if the proposed project design will be able meet the provisions that will be set forth in the NPDES permit. At this time, staff is uncertain that the Unit 7 project, as proposed, would comply with an NPDES permit issued for the project. However, compliance can be assured by the applicant implementing an upland alternative cooling technology. Staff is requiring the project owner to receive an NPDES permit prior to operation in **SOIL & WATER-2**.

### **STATE**

Section 66605 of the McAtteer-Petris Act states that “...fill can be authorized only when no alternative upland location exists for such purposes (i.e. cooling)”. In a report

submitted by the applicant titled "Evaluation of Cooling Water System Alternatives", the applicant identified upland locations for the alternatives that they have deemed "technically feasible". The evaluation further claimed that "when evaluated for total costs the feasible alternative cooling systems ranged from less costly to as costly as the proposed once-through system" (MIRANT2001Cooling). Staff has also provided a cooling options study as an appendix to the **Aquatic Biological Resources** section of this FSA that identifies feasible, proven, reliable, and cost-effective upland alternatives. Therefore, staff believes that the proposed once-through cooling system may not be in compliance with the McAteer-Petris Act.

The San Francisco Bay Conservation and Development Commission (BCDC) will present its determination regarding bay fill issues prior to the evidentiary hearings. BCDC is required to make recommendations to the Commission regarding measures to avoid the impacts of bay fill, which includes the cooling water intake and outfall structures. Should BCDC ultimately recommend an upland alternative to once-through cooling, the Energy Commission could only license a project with once-through cooling if it found the upland alternative to have a greater adverse environmental impact or that the alternatives to bay fill were found to be infeasible. Staff finds that there are feasible upland cooling alternatives (refer to Staff's Cooling Options Study, appendix to the **Aquatic Biological Resources** section of the FSA.)

## **FACILITY CLOSURE**

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The Unit 7 project is expected to operate for a minimum of 40 years. Closure options range from "mothballing," with the intent of a restart at some time, to the removal of all equipment and facilities.

The facility closure plan will be submitted to the California Energy Commission for approval prior to decommissioning. Compliance with all applicable LORS will be required. The plan will address all concerns in regard to potential impacts to soil and water resources.

## **RESPONSES TO PUBLIC AND AGENCY COMMENTS ON THE PSA**

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Staff received 59 soil and water-related comments from the public and agencies on the Preliminary Staff Assessment. Below is a listing of those comments and staff's responses regarding Soil and Water Resources. Soil and water-related comments from the intervenors and the applicant have been addressed in the analysis, where appropriate. 41 of the 59 comments concern impacts due to construction and/or operation of the proposed once-through cooling system. These concerns will be eliminated with the implementation of an upland cooling alternative, which staff is recommending for use by the Unit 7 project.

## **SAN FRANCISCO BAY CONSERVATION AND DEVELOPMENT COMMISSION (BCDC)**

**BCDC-2:** *The FSA needs to provide further elaboration regarding Section 66605 of the McAteer-Petris Act.*



**Response:** Staff has addressed the McAteer-Petris Act in the LORS and Compliance with LORS section of the FSA.

**BCDC-3:** *The BCDC presents an overview on the San Francisco Bay Plan policies and their applicability to the SFRWQCB Basin Plan. BCDC states that the policies guidance and support via the SWRCB and SFRWQCB should be the basis for carrying out the BCDC's water quality responsibilities.*

**Response:** Staff has addressed this comment. Please refer to the LORS section of the FSA.

**BCDC-4:** *The BCDC provided additional information the San Francisco Bay Plan policies on dredging.*

**Response:** Staff has addressed this comment. Please refer to the LORS section of the FSA.

**BCDC-5:** *The PSA failed to cite Section 66605 in the LORS discussion, except an incorrect Subsection (f). The incorrectly stated subsection mandates legislation for the California Coastal Commission, which does not have jurisdiction within the San Francisco Bay.*

**Response:** Refer to Response provided in **BCDC-2**.

**BCDC-6:** *The BCDC provides an overview on Water Quality Policy No. 2 as part of the San Francisco Bay Plan.*

**Response:** Staff has addressed this comment. Please refer to the LORS section of the FSA. Please also refer to the LORS discussion on Section 401 Water Quality Certification, which will promote communication between the applicant and SFRWQCB.

**BCDC-7:** *The BCDC requests detailed LORS information regarding the San Francisco Bay Plan dredging policies.*

**Response:** Comment noted. Staff's general overview of these policies provides sufficient background information.

**BCDC-8:** *The BCDC provides background information about the DMMO, its role regarding dredging and filling within the Bay, the agencies involved and the permits that will be issued upon review and approval of the DMMO application.*

**Response:** Staff appreciates the overview and clarification regarding DMMO. Please note that the LORS section has been amended.

**BCDC-Conditions of Approval:** *Soil and Water Resources and Aquatic Biological Resources: The BCDC provided special conditions and recommends that the CEC incorporate them into the FSA.*

**Response:** Staff has reviewed the proposed special conditions offered by the BCDC, however, due to staff's recommendation of an upland alternative cooling system, these conditions have been removed because they no longer apply.

## **CALIFORNIA DEPARTMENT OF FISH AND GAME (CDFG)**

**CDFG:** *Under the title "Construction", the CDFG expressed concern about proper maintenance of the silt curtains during dredging and construction operations of the proposed intake and discharge structures.*

**Response:** As per the discussion with the SFRWQCB at the July 17, 2001 DMMO meeting, a plan will need to be provided from the applicant regarding the offshore dredging activities. However, implementation of staff's recommendation of an upland alternative cooling system will eliminate the concern for impacts to the Bay.

**CDFG:** *Under the title "Thermal Impacts", the CDFG expressed concern about thermal increases greater than 4°F at the Bay floor or in any part of the water column should be considered as a potential significant impact given the numerous invertebrate and finfish which utilize the proposed project site. Furthermore, due to the adhesive nature of spawned Pacific herring eggs which will likely occur on substrates adjacent to and including the outfall structure, the potential for impact to this species particularly needs to be addressed.*

**Response:** Temperature rises exceeding 4°F will be limited to the individual discharge jets, which will not touch the sea floor. A conservative estimate of the water volume with a temperature rise greater than 4°F can be obtained by assuming that the entire jets, up to the surface, will exceed 4°F. The corresponding volume is about 100,000 ft<sup>3</sup>, which is about 1.5% of the volume of water from the shore to the end of the diffusers. The biological impacts of this volume of heated water are discussed in the **Aquatic Biological Resources** section of this FSA. However, this volume of heated water would be eliminated completely if an upland alternative cooling system is implemented for the project.

The surfaces that will have elevated temperatures are the individual nozzles, whose area is a small part of the substrate area in the vicinity of the cooling system.

## **CITY AND COUNTY OF SAN FRANCISCO (CCSF)**

**CCSF-4A:** *"Intake Withdrawal and Thermal Discharge of Bay Water - The PSA does not adequately consider the implications of the intake and discharge dynamics upon circulation and thermal structure of the receiving water environment ... The intake has the potential to 1) alter local circulation patterns, 2) thermally load the receiving environment under certain hydrodynamic conditions, 3) alter normal deposition rates of detrital flux to the seafloor and 4) contribute significantly to the mortality of entrained larval fish, invertebrate and planktonic populations..."*

**Response:** Staff agrees that the proposed plant will withdraw and discharge large volumes of water. The volume of water circulated during one half tide cycle (6.2 hours) is about 15.7 million cubic feet. In comparison, the tidal prism, i.e. the volume of water flowing into and out of South Bay during each half tide cycle, is about 27 billion cubic

feet, or 1,720 times the cooling water volume. Therefore, the cooling water system is not expected to significantly modify circulation patterns. However, impacts to fishes, invertebrates and planktonic life are addressed in the **Aquatic Biological Resources** section. Staff's recommendation of an upland alternative cooling system would eliminate all concerns regarding circulation patterns in the Bay.

**CCSF-4D:** *"Thermal Effects - Whereas the new discharge design dissipates the thermal load to comply with the Thermal Plan requirements (e.g. surface temperatures shall not exceed 4 degrees Fahrenheit above ambient), the actual thermal loading to the nearshore zone will be approximately doubled and average temperatures over an extended area will be significantly increased."*

**Response:** The area affected by a temperature rise of 1 degree Fahrenheit or greater will be on the order of 16 square miles, which is approximately 7% of the 215 square mile area of South Bay. Please refer to the **Aquatic Biological Resources** section for a discussion of thermal impacts on biological resources.

**CCSF-4E:** *"Sediment Boundary Layer Processes - Physical factors associated with the proposed Unit 7 construction and operation may alter the existing equilibrium dynamics of sediment deposition and resuspension, potentially altering the consistency of sediment in the nearfield, with the possibility of mobilizing fine sediment from the seafloor and increasing turbidity within the water column [...] A second physical factor that will influence the normal flow of bottom water will be the emplacement of the discharge pipes, each 54" in diameter..."*

**Response:** Peak tidal velocities in the outfall area are reportedly on the order of 4 ft/s. These velocities are quite high and are sufficient to erode "fine sediment". Although the sediments in the proposed outfall area are fine, they are sufficiently consolidated to sustain the high tidal currents to which they are subjected 4 times a day at peak flood and ebb. The addition of the outfall will cause local acceleration of current speeds, and possibly flow separation in the lee of the outfall pipes. These may create additional erosion, but a new equilibrium state will soon be reached. Therefore, the additional erosion caused by the outfall will only result in temporary effects on suspended solids in the area.

**CCSF-4G:** *"Altered Trophodynamics - There is also the possibility of an increase in flux of organic matter to the sediments resulting from the mortality and deposition of dead organisms that have passed through the cooling system. [...] Other marine outfall studies have noted the attractant properties of discharges to fish and macroinvertebrates that feed upon discharged organisms."*

**Response:** Dead organisms that have passed through the cooling system will be deposited over a large area of sea floor. This area can conservatively be estimated as the tidal excursion, about 8 km (Walters, Chang and Conomos, 1985), multiplied by the 200 ft width of the outfall. The corresponding area is 490,000 square meters. In reality the plume will spread laterally, so this is an underestimate. The resulting deposition flux will be low and should not result in increased benthic activity.

Enhanced biological activity can arise near wastewater outfalls, which discharge organic suspended solids and nutrients. Such attraction is not usually a factor for thermal outfalls, which have very low nutrient contents, even with dead organisms.

**CCSF-4H:** *“Cumulative Impacts – The PSA does not adequately treat potential cumulative impacts from other local and near-regional perturbations of the nearshore environment such as discharges from the Southeast Wastewater Treatment Plant (SWTP).”*

**Response:** The distance between the Potrero intake/discharge and the SWTP is about 1 km. At that distance, both plumes will have undergone significant dilution and it is not expected that detrimental synergistic impacts will occur.

**CCSF-14B:** *The PSA includes no information on impacts related to pollutants listed as causing impairment in San Francisco Bay (Clean Water Act 303(d) list).*

**Response:** The proposed cooling water system is a closed system designed to take in water from the bay, pass it through the plant condensers and discharge it back to the bay without changing the chemistry of the water. The constituents listed are not added to the cooling water process and semiannual testing for Unit 3 since June 1998 has shown either non-detectable amounts or insignificant differences between the plant intake and discharge.

**CCSF-14C(i):** *Modeling of thermal effects of the discharge of Unit 3 and the proposed unit 7 is necessary to estimate environmental effects. Without knowledge of the total flow of the discharge and the estimated temperature change, the effects on fish migration and spawning and the effects on benthic habitat are impossible to predict.*

**Response:** See response to comment **SFBK-1A**, in the San Francisco BayKeepers comment section. Please also refer to the **Aquatic Biological Resources** section of this FSA for further discussion. In addition, please note that staff is recommending that the project utilize an upland cooling water alternative that will eliminate thermal impacts to the Bay system.

**CCSF-14C(iii):** *The PSA does not appear to address issues related to certain regulatory constraints, such as the “impaired waterways” as listed under Clean Water Act 303(d). Provide clarification on the status of the NPDES stormwater permit for Industrial Activities.*

**Response:** See response to comment CCSF-14B regarding the 303(d) issue. Industrial Discharge will be covered under NPDES permit No. CA0005657.

**CCSF-14C(iv):** *The PSA does not appear to address cross-media issues such as dioxin generation and fallout or water quality implications from other air pollutants (dry and wet particulate fallout leading to watershed acidification).*

**Response:** Dioxins are generated as the result of certain combustion processes and are not generated in the plant water systems. Considering the once through cooling alternative, if dioxins were present in the cooling water they would be passed through the plant cooling system and discharged back to the bay. Water supplied by the city

that is treated for plant use has not been identified to contain dioxins. Since none of the plant water systems are a source for dioxins, waste discharges would not contain dioxins. Therefore, from the perspective of plant water resources, water use, and wastewater discharges, none of the plant processes will generate dioxins or discharge dioxins. Please see the **Air Quality** section for more information.

**CCSF-14C(v):** *“Circulation Patterns - Impacts of discharge on circulation patterns are not discussed.”*

**Response:** See item **CCSF-4A**.

**CCSF-14D(ii):** *Although the discharge structures are being moved into deeper water (and thereby into an area of larger tidal flows), the change in ambient temperature estimated in the document still exceeds the California Thermal Plan Limits. The impacts of such a large temperature change to the surrounding fauna is currently unknown and must be described prior to project initiation. Because the area is used by many important species an evaluation of the thermal impacts is essential.*

**Response:** Please refer to response for comment **CCSF-14C(i)**. Please refer to the **Aquatic Biological Resources** section for more information.

**CCSF-14D(vi):** *“Intermittent Heat Treatment. There is no indication what the thermal change is during those periods when heat treatment has occurred. This impact needs to be characterized. Although the discharge will be in deeper water, a blast of heated water twice per month could have severe impacts on local fauna as well as plankton and fish passing in the vicinity of the discharge.”*

**Response:** Mirant is reportedly developing a means of mixing the recirculated water slug with flow from the other unit to minimize discharge temperatures. However, staff is recommending the use of an upland alternative cooling system that would completely avoid the uncertainty of the impacts from these discharges.

**CCSF-14D(ix):** *The procedures used for the chemical treatment of the intake structures to minimize fouling (sodium hypochlorite and sodium thiosulfate) are not adequately described. The discharge site should be equipped with a continuous chlorine monitor to evaluate complete neutralization of the hypochlorite before discharge. In addition, a study on chlorinated/dechlorinated wastewater treatment plant effluent found sublethal adverse impacts on juvenile crabs. Would such impacts potentially result from the chlorinated/dechlorinated flows resulting from the plant’s chemical treatments?*

**Response:** All project wastewater discharges, including those associated with biofouling controls, will be covered under the NPDES permit. Staff recognizes the importance of accurately monitoring short-term, high-concentration discharges of chlorine into the Bay. However, staff has not provided requirements pertaining to once-through cooling discharges because staff is recommending that an upland alternative cooling system be implemented for this project. Please refer to the **Aquatic Biological Resources** section of this FSA for information regarding impacts to biological resources.

**CCSF-14D(x):** *Provide further discussion on the stormwater associated with Unit 7 and clarify if it will be considered a new source of discharge and if any applicable permits are required.*

**Response:** As described in the Impacts discussion above, the quantity of post-condition runoff will not exceed the pre-condition. Also, from a water quality standpoint, the applicant intends to utilize BMPs to prevent polluted runoff from being discharged into the bay and/or sewer system.

**CCSF-14D(xi):** *It is not clear that the outfall is allowed under one of the existing Nationwide 404 permits. [Staff] should also mention the requirement for a 401 certification of compliance with water quality standards. In addition, the same or another permit will address the stormwater runoff from the site (unless it is discharged into the city's combined sewer system in which case it must adhere to the certain municipal pollution prevention requirements).*

**Response:** Staff believes that the LORS section provides a sufficient background of applicable LORS. Guidelines for sewer discharge are provided above in the **Impacts** discussion.

**CCSF-14D(xii):** *Under "State" [in the LORS section of the document] the PSA needs to discuss the California Water Code, which provides for concurrent waste discharge requirements (WDRs), along with the NPDES permit. Under "State", the PSA should note water quality standards and the California Thermal Plan, and describe 401 certification requirements.*

**Response:** The LORS section contains discussions of the California Water Code and the California Thermal Plan. Section 401 is noted in the "Federal" section under the Clean Water Act. Staff believes that the LORS section provides a sufficient background of applicable LORS.

**CCSF-14D(xiii):** *Address the San Francisco pollution prevention program in the Local LORS section of the FSA.*

**Response:** Staff included the applicable code and Article regarding discharge requirements related to the CCSF sewer system in the PSA. Please also see "San Francisco Municipal Code" in the LORS discussion above.

**CCSF-14D(xiv):** *Nickel and copper are slightly elevated in the existing discharge and are likely introduced through corrosion of the piping. The new discharge will possibly have increased levels. The Central Bay is listed (303(d)) as impaired by copper. EPA's policy is that no new mass of listed constituents may be introduced into impaired waters. Either treatment (to zero increased discharge) or offsets are required. There is an effort underway to de-list copper, however, this process will likely not be complete for several years.*

**Response:** There is no evidence that Unit 7 will increase the levels of copper or nickel to the Bay. Tests of the existing plant do not consistently show increases in copper or

nickel from the intake to the discharge. Materials of construction of the cooling water system are generally selected to avoid the effects of seawater corrosion.

**CCSF-14D(xv):** *The PSA did not address the following issues: NPDES effluent and industrial stormwater requirements; 303 (d) impaired waters; State Thermal Plan; Section 401 Water Quality Certification; and the San Francisco pollution prevention and pretreatment program. The CCSF Bureau of Environmental Regulation and Management (BERM) also discusses that discharging dewatered groundwater into the public sewer system would require batch wastewater permits. The applicant also needs to acquire an Industrial Wastewater Discharge –Class I Permit.*

**Response:** Please refer to the response provide under **CCSF-14D(x)** for the Industrial Stormwater issue. NPDES effluent and industrial stormwater requirements, 303 (d) impaired waters, State Thermal Plan and Section 401 Water Quality Certification are addressed in the Impacts discussion above. Refer to the LORS, Impacts and Conditions of Certification discussions in this section that address the “San Francisco Municipal Code”.

**CCSF-14E(v):** *Ensure that any revegetation strategies consist of only native vegetation.*

**Response:** The Staff Proposed Mitigation section of the FSA includes a provision that requires native vegetation for interim and permanent revegetation strategies. **SOIL & WATER-1** will ensure that this issue is addressed.

**CCSF-14E(vi):** *CCSF reserves the right to comment further in the revised PSA or FSA after more data, analyses and evaluation as indicated above are available.*

**Response:** Comment noted.

**CCSF-14F(i):** *Stormwater runoff can overload the City’s combined sewer system causing untreated overflow to be discharged into the Bay. The applicant should either have zero discharge into the City’s sewage system or contribute to the City’s efforts to improve storm water management capabilities.*

**Response:** As discussed in the Impacts section, under stormwater, the applicant will not contribute additional stormwater to the City’s sewer system with the addition of the Unit 7 project. Proposed Staff Mitigation, **SOIL & WATER-1** and **SOIL & WATER-2** will ensure that stormwater quantity and quality to the City’s sewer system are within compliance.

**CCSF-14F(ii):** *The City of San Francisco recommends that the applicant utilize any excess capacity in a new or existing outfall to accept overflow discharge and/ or stormwater from the City’s combined sewer system. The applicant should discuss the aforementioned issues with the CCSF.*

**Response:** Because stormwater discharges are permitted under the Clean Water Act, Staff recommends that the CCSF contact the SFRWQCB to discuss the abovementioned issues.

**CCSF-14G(i):** *On a continuing basis, the San Francisco Port addresses numerous issues pertaining to contaminated sediments along the waterfront. Such sediments may be encountered during dredging projects, wetland restoration projects, and redevelopment projects. The Port and the regulatory agencies that oversee contaminated sediment issues have established a good working relationship to address these sediments when they are encountered. All parties agree that there are unanswered questions regarding contaminated sediments, such as the toxicity of different compounds, how chemicals are transported in the Bay, and how specific compounds affect the food web.*

**Response:** Comment noted. Please refer to the following responses regarding dredging impacts and to the **Impacts** discussion above for more information. In addition, staff is recommending an upland cooling alternative be used by the project which will avoid the need for any dredging activities.

**CCSF-14G(ii):** *How will the design and/or construction minimize any further migration of PAH liquid during construction?*

**Response:** As noted in the Impacts discussion above, the proposed location of the intake and discharge structures is within an offshore area that is south of the greatest accumulation of PAH in sediments. PAH liquids were rarely found in borings completed in sediments within this area. Selection of this area for placement of the intake/discharge structures helps to reduce the disturbance of sediments with elevated concentrations of PAHs and minimize the potential migration of PAH liquids that may be locally encountered in offshore sediments during construction.

As part of the offshore construction, temporary cofferdams constructed of steel sheetpile will be installed to allow for excavation of the sediment and construction of the intake and outlet structures. The steel sheetpiles will be driven 20 feet or more into the sediment. Once the sheetpiles are installed, the construction area will be dewatered. After dewatering, the sediment will be excavated and appropriately disposed at an upland landfill. As a condition of construction approval, the cofferdams should be specified to be generally leak-proof, such that PAH liquids and/or sheens that may be present within surrounding sediments are prevented from entering the excavation. This will help to minimize the migration of PAH liquids that may be encountered during construction. However, staff is recommending an upland alternative cooling system for the Unit 7 project, which would eliminate all offshore sediment concerns.

During onshore construction activities, dewatering will be required, which may result in the transport of contaminants contained in groundwater or in free product pools towards the dewatering areas. PAHs (primarily naphthalene) were detected in groundwater in the eastern sections of the site, along the Bay. The highest concentrations were detected in the northern part of this area (12,900 ppb at TB3-005). This area corresponds to a zone where a pool of dense free product (DNAPL: dense non-aqueous phase liquid), containing naphthalene was identified. The high groundwater concentrations likely result from the dissolution of free product contained in the DNAPL pool. Along the Bay, dewatering will be required primarily in the southern portion of the site, for the construction of the cooling water intake and discharge conduits. Thus, it is unlikely that the dewatering will cause the movement of the DNAPL pool at the



northeastern section of the site. However, the dewatering water may contain some dissolved PAHs from local groundwater, albeit at relatively low concentrations. It is anticipated that the revised Site Mitigation and Implementation Plan required in Condition of Certification **SOIL & WATER-3** will contain monitoring requirements that will allow detection of PAHs and other contaminants in dewatering waters, allowing judgement to be made as to their proper disposal.

**CCSF-14G(ii), cont.:** *How will the design and/or construction minimize any further migration of PAH liquid after completion of construction?*

**Response:** The design of the intake structure includes installation of a ~2 feet thick concrete retaining wall along the shoreline and a ~3 foot thick concrete slab at the bottom of the intake structure. Although these features are designed to support the overlying intake structure, the concrete slabs also serve to minimize the lateral and/or vertical migration of PAH liquids that may be present in adjoining sediments. In addition, sheetpile wing walls (extending 40 – 80 feet easterly, into the bay) will be permanently installed at the northeastern and southeastern corners of the intake structure. Although installed to protect the offshore portions of the intake structure, the sheetpiles will also help to minimize the potential lateral migration (north to south) of PAH liquids that may be present in adjoining sediments.

Likewise, each of the discharge conduits are encased in a ~1.5 to 2 foot thick concrete outlet structure with an accompanying 20 foot long concrete support slab beneath the discharge pipes. As stated above, these concrete features will minimize the migration of PAHs that may be present in the sediment. Since the discharge pipes themselves will be placed on top of the sediment (with accompanying soil stabilization fabric, gravel fill and marine mattress), they are unlikely to affect PAH liquid migration in the underlying sediment.

As stated above, staff's recommendation of an upland alternative cooling system will eliminate all offshore sediment concerns.

After completion of onshore construction activities, the groundwater flow regime will return to the pre-construction conditions, so that PAH migration will be similar to that currently occurring. Independently, a remediation plan is under development to address the DNAPL at the site and prevent its migration to the Bay.

**CCSF-14G(ii), cont.:** *How does the presence of PAH in site sediment impact human health and the Bay Environment? What specific studies can provide the data required to quantify these risks?*

**Response:** Generally speaking, PAH concentrations in sediment samples collected from locations near the proposed outfall and intake structures have PAH concentrations that increase with depth. The concentration of total PAHs in surface and near-surface sediments samples collected from 0-4 feet depths (e.g., the biologically active portion of the sediment) range from 1,780 to 17,760 parts per billion (ppb). This range includes concentrations that are above sediment thresholds reported by the SFRWQCB of 4,022 ppb and 3,390 ppb for effects range low (ER-L) and ambient San Francisco Bay sediment values, respectively suggesting the potential for toxic effects. Simple

comparison to threshold values cannot determine whether the local presence of PAH in sediments represents a significant impact to human health or the environment. Human health and ecological risk assessment studies can be conducted to generate data that can be used to quantify these potential risks. As discussed below, the contaminated sediments are being addressed by PG&E and their consultants. As part of that process, cleanup levels to protect human health and the environment will be established prior to remediation. Regardless, removal of the ~6,100 cubic yards of sediment for construction of the outfall/discharge structures is likely to have an overall benefit in reducing the potential exposure to PAH-containing sediments. (See also Public Health, response to **AUD-11**.)

**CCSF-14G(ii), cont.:** *Will the construction or operation of the plant remobilize the existing PAH, causing further impacts to human health or the environment?*

**Response:** Please refer to the **Waste Management** section of the FSA. This section addresses the aforementioned issue under the Impacts discussion and within the Conditions of Certification.

**CCSF-14G(ii), cont.:** *What is the status of any voluntary cleanup efforts or Regional Board cleanup orders regarding the site? Do these efforts/orders cover only the land part of the site?*

**Response:** PG&E, the responsible party, requested the Site Designation Committee of the California Environmental Protection Agency, to designate an administering agency to oversee voluntary site investigation and remedial action at the Potrero Power plant site. The San Francisco Bay Regional Water Quality Control Board is the administering agency for cleanup of the hazardous materials release site (CalEPA 2001). According to SFRWQCB staff, under the Site Designation Program, PG&E is responsible for investigation and cleanup of both land and offshore sediments (Pal 2001). Currently, the SFRWQCB and PG&E are focused on the land portion of the property and Geomatrix, PG&E's consultant, is in the process of finalizing a work plan to further characterize Dense Non-Aqueous Phase Liquids (DNAPLs) that are present in on-site soils and fill data gaps. SFRWQCB staff indicated that PG&E is responsible for contaminated sediments and these will be addressed in the future.

**CCSF-14G(ii), cont.:** *Does an agreement exist between PG&E and the applicant that specifies which corporation shall be responsible for investigation and/or remediation of the contaminated sediments and associated free-phase PAH liquid?*

**Response:** As stated above, according to the SFRWQCB, PG&E is responsible for investigation and/or remediation of contaminated sediments (and presumably PAH liquids). Also, please refer to the **Waste Management** section of the FSA that addresses this issue.

**CCSF-14G(ii), cont.:** *PG&E's consultant (Geomatrix, 2000; p.30), hypothesized that the dense, non-aqueous, free-phase, PAH liquid encountered in monitoring wells beneath the site was not a threat to the Bay due to a "low permeability ridge" of Bay Mud that Geomatrix claimed existed along the shoreline. The data supporting this hypothesis was limited; the existence of PAH liquid beneath the sediments in the Bay indicates this hypothesis is false. In light of the more recent Bay sediment data*

*(URS/Dames & Moore, 2000 and 2001), how will the new or previous site owner address the PAH liquid beneath the site?*

**Response:** As stated above, further characterization of DNAPLs (i.e., PAH liquid) is being conducted to better understand site conditions. SFRWQCB staff indicated that the naturally occurring barrier and its potential for preventing DNAPL migration is being addressed in the work plan being prepared by Geomatrix. The remedial action necessary to address the presence of DNAPLs has not been determined at this time, but will likely be part of the overall remedial plan to be approved by the SFRWQCB in the future.

Please note that the presence of PAH liquids within sediments does not necessarily mean that these liquids migrated from onshore contaminated soils/fills to the bay sediments. Boring logs indicate that in the more contaminated portions of bay sediments (especially offshore of the former manufactured gas plant), coke and tar materials saturated with product material (with high PAH content) are present within the sediment (see for example the log of Boring PP-14 in the Final Offshore Sediment Characterization Report). Apparently, free-phase DNAPLs were part of the original coal gasification wastes that were used to fill the Bay and these materials are now buried by bay sediments.

## **DEPARTMENT OF TOXIC SUBSTANCES CONTROL (DTSC)**

**DTSC- 2:** *The DTSC expressed concern regarding groundwater contamination, including LNAPL and DNAPL, has been identified underlying the PSE&G Potrero Site. Therefore, it is important to evaluate the impacts of dewatering activities for the proposed construction... This evaluation should be contained in a revised Site Mitigation and Implementation Plan [...] DTSC requests that the Verification requirement Page 4.14-34, Soil & Water 5, be revised to require San Francisco Regional Water Quality Control Board (RWQCB) review and approval of this document prior to site mobilization."*

**Response:** Condition of Certification **SOIL & WATER-3**, which requests a revised Site Mitigation and Implementation Plan, has been amended to require SFRWQCB review and approval.

**DTSC- 3 & 12:** *The DTSC is concerned about proper placement and disposal of fill and that final amounts of excess fill are addressed within the SMIP. Worker safety is also a concern during grading and groundwater-related activities.*

**Response:** Please refer to the **Public Health** and **Worker Safety** sections of the FSA for issues dealing with worker safety. Fill amounts and disposal criteria are addressed in **SOIL & WATER-3**.

**DTSC- 9:** *The DTSC expressed concern that reusing bentonite slurry should only be allowed if the slurry is clean.*

**Response:** Staff has addressed this request in **SOIL & WATER-4**.

**DTSC- 11:** *The DTSC would like COC 8 to be amended to require the applicant to submit sampling data to the CPM within 5 days of obtaining the results.*

**Response:** Staff has addressed this request, which is now contained in **SOIL & WATER-5**.

**DTSC-13:** *[DTSC] recommends that **SOIL & WATER-6** be amended to require RWQCB approval of the Ecological Risk Evaluation and remedy selection document prior to site mobilization. It is unclear whether the 60 day timeframe provided is sufficient to achieve this.*

**Response:** This requirement deals primarily with biological resource impacts. Aquatic biological resources staff has not determined that there is a biological impact due to contaminants during construction because they are doing marine construction either within a coffer dam or within a silt curtain. An ecological risk assessment would typically be done to determine the level of clean up necessary. Remediation of the existing contamination (where not required to mitigate impacts) is not part of the Unit 7 project. Therefore this requirement has been removed. Refer to the **Aquatic Biological Resources** section of this FSA for more information.

## **GOLDEN GATE AUDUBON SOCIETY (AUD)**

**AUD-6:** *What are the hydrologic impacts to the Bay from having so large an amount of water being sucked out every day? Will this impact flow regimes further south along the shoreline of the Bay?*

**Response:** While the amount of water withdrawn by the plant is large, the same amount is re-discharged into the Bay so that the net withdrawal is zero. As documented in response to CCSF-4A (see above), the volume of water withdrawn and discharged by the plant is a small portion of the volume of water flowing by the plant during each tide cycle (called the tidal prism), so that the impact on Bay flow regime is expected to be minimal.

**AUD-8:** *[Staff] needs to analyze the cumulative impacts that will result from other projects such as the Port of Oakland's 50-foot dredging project, the San Francisco Airport's proposal to use a borrow pit relatively close to this project and the possible contaminants released from activities at Hunter's Point.*

**Response:** The incremental impact by this project's dredging will be reduced to minimal levels due to Best Management Practices to be approved by the DMMO and implemented by the project. It can be assumed that the DMMO will put similar requirements on other dredging projects in the Bay, therefore, the impact of the other projects is or will be minimal as well. However, staff is recommending that the project use an upland alternative cooling system, which will avoid all impacts associated with construction of new intake and discharge structures.

## **NATIONAL MARINE FISHERIES SERVICE (NMFS)**

**NMFS 5:** *The concentration of copper and nickel were shown to be elevated slightly at the discharge compared to the intake in June 2000.*

**Response:** Unit 3 test results from June 2000 showed values of copper as 0.012mg/L and 0.17mg/L in the intake and outfall, respectively. Test results for nickel were 0.015mg/L and 0.017mg/L for the intake and outfall, respectively. In December 2000 NPDES tests for copper were 11µg/L (.011mg/L) in the intake and 7µg/L (.007mg/L) in the outfall showing a reduction. Nickel sampling at both the intake and outfall were measured essentially equal at >5µg/L (.005mg/L). Unit 7 is not expected to contribute additional amounts of copper or nickel to the San Francisco Bay.

## **PIER 70 ADVISORY GROUP (P70)**

**P70-2A:** *Require Mirant to perform complete on-site containment and treatment of stormwater discharge, or require Mirant to contribute to the City and Port efforts to improve stormwater management capability in the Southern Waterfront to protect water quality in the Bay. Such contribution should be consistent with the additional demand for storm water treatment or management associated with the power plant site.*

**Response:** Please refer to staff's response to comment **CCSF-14F(i)**.

**P70-2B:** *Project construction would require dredging of contaminated Bay sediments and on-site excavation of contaminated soil.*

**Response:** Please refer to staff's response to comment **CCSF-14G(i)** and **CCSF-14G(ii)**.

## **POTRERO POWER PLANT CITIZEN'S ADVISORY TASK FORCE (PTF)**

**PTF-6:** *The PSA indicates that the water supply needed for plant operations could have significant impacts on the region, but states that there is insufficient information to assess possible mitigation. Given emerging water scarcity throughout the state, this impact should be fully investigated and offset before the final staff assessment.*

**Response:** Staff has not determined that the Unit 7 project will have water supply scarcity impacts. The potential impacts stemming from water supply-related construction and operation are related to water quality, LORS, and aquatic biological resources. Because the once-through cooling system does not consume water supply (through evaporation or other means rendering the water unusable), the quantities of water used by the project will not have a significant impact on water supplies.

**PTF-7:** *The PSA indicates that absent an NPDES permit it cannot be determined whether the plant would induce significant water quality impacts. Given increasingly strict water quality standards associated with the California Toxics Rule and Total Maximum Daily Load Requirements, it would seem important that appropriate water quality information should be developed to ensure that the plant meets future Bay water quality requirements.*

**Response:** The Regional Water Quality Control Board has not yet released the draft NPDES permit at this time. A draft was initially released and was subsequently pulled back by the Board. Staff is requiring the project owner to receive an NPDES permit prior to site mobilization in Condition of Certification **SOIL & WATER-2**. Staff expects to have a draft permit prior to the evidentiary hearings, and will be able to

provide testimony regarding NPDES issues at that time. Please refer to the **Compliance with LORS** discussion above for more information.

## **SAN FRANCISCO BAYKEEPER (SFBK)**

**SFBK-1A:** *Please explain how the project's impact can be evaluated without characterizing the thermal plume that will result from the discharge.*

**Response:** Thermal plume impacts are primarily related to the area near the discharge where induced temperature rises are highest. The plume characteristics in this area have been characterized by mathematical and scale physical modeling (Mirant 2001I, Mirant 2001m). While some questions remain relative to optimization of the diffuser, the characterization provided by the applicant is sufficient to assess impacts. See the **Aquatic Biological Resources** section of this FSA for further discussion of thermal plume impacts.

**SFBK-4A:** *Rules proposed by USEPA would prohibit certifying a once-through cooled power plant discharging to an estuary.*

**Response:** BayKeeper is referring to new USEPA Clean Water Act Section 316(b) rules that regulate cooling water intakes for power plants. It is their interpretation that these rules would prohibit certifying a once-through cooling water system at Potrero. Staff received a letter from USEPA Region IX stating that the project will be considered a "new source" and "new facility" and therefore will be subject to the new regulations. However, USEPA Headquarters provided Region IX with a letter that rescinds that determination, stating that the Unit 7 project is not a "new facility" as defined by the new regulations, and therefore would not be subject to the new 316(b) regulations. . Regardless, staff is recommending that one of the feasible upland cooling technologies be implemented by the project in lieu of the proposed once-through cooling system.

**SFBK-4B:** *Because it is the most destructive, least protective, antiquated technology, once-through cooling cannot be considered Best Technology Available (BTA).*

**Response:** Section 316(b) has been previously implemented for projects using once-through cooling systems and provides for the possibility that such systems can be designed to comply with the rule. However, staff recommends the use of an alternative upland cooling technology instead of the proposed once-through cooling system for the Unit 7 project. Please refer to the **Aquatic Biological Resources** section of this FSA for further discussion of BTA issues.

**SFBK-4C:** *Dry cooling must be required as BTA because it is an available, effective, affordable technology, which minimizes adverse impacts.*

**Response:** Dry cooling has been included in the cooling options study, appendix to the **Aquatic Biological Resources** section of this FSA. The study includes an assessment of environmental (biology, cultural resources, land use, visual resources, public health, noise, air quality, water use, and waste management), operational (plant capacity, efficiency, and reliability) and capital costs considerations.

**SFBK-4D:** *Screens and booms do not comply with the statute's mandate to "minimize" adverse environmental impacts.*

**Response:** Staff agrees that once-through cooling does not minimize adverse environmental impacts and is considering all of the environmental impacts resulting from once-through cooling and the alternative cooling water designs to determine compliance with applicable regulations. Staff's recommendation of an upland alternative cooling system would effectively minimize adverse water-related impacts. Please refer to Staff's Cooling Options Study for more information.

**SFBK-4E:** *While the Clean Water Act does not contemplate the consideration of economics in choosing the Best Technology Available, we note that dry cooling is economically viable.*

**Response:** BayKeeper's position that dry cooling is economically feasible is based on data derived from an economic case study for the Indian Point Nuclear Power Plant. The question of economic feasibility is project specific and the results of one plant may not apply to other types of generating facilities at other locations. Therefore, the values presented for Indian Point may not be directly applicable to Potrero Unit 7. However, staff also considers dry cooling and other closed-cycle cooling alternatives superior to once-through cooling.

## **SAN FRANCISCO BAY REGIONAL WATER QUALITY CONTROL BOARD (RWQCB)**

**RWQCB-1:** *Due to the absence of real time monitoring data, the environmental impacts of the new cooling water discharges cannot be fully characterized. The draft NPDES permit includes provisions requiring Mirant to collect intake and effluent chemical data, conduct a dioxin special study, conduct a thermal effects study and conduct an entrainment/impingement effects study after completion of construction. The draft permit includes language granting exceptions to the thermal plan and conditionally finds the intake structure is Best Technology Available (BTA). However, the thermal exception and BTA finding may be revised or revoked based on the results of studies.*

**Response:** The draft permit in question has since been pulled from Board consideration at this time. However, staff would support this proposal if it were contained in the final NPDES permit. Staff does not consider once-through cooling BTA in regards to CEQA consideration.

**RWQCB-2:** *Water Quality During Intake Structure Construction: Turbidity and mobilization of contaminated sediments during dredging and capping activities may affect water quality. Although the applicant has submitted conceptual information, the RWQCB needs to see more specific information in order to determine water quality impacts.*

**Response:** Staff notes the comment offered by the RWQCB. However, due to staff's recommendation of an upland alternative cooling system, requirements regarding these issues have been removed because they no longer apply.

**RWQCB-3:** *An additional concern with the project is whether the increased intake and discharge of cooling water will affect circulation in the Bay locally, leading to remobilization of contaminants. Through a Porter-Cologne Act Section 13267 letter and the NPDES permit, Board staff will require Mirant to conduct pre-project baseline and post-construction biological and chemical monitoring and assessment to address questions about circulation changes and remobilization of contaminants. Mirant is strongly encouraged to consult with Board staff immediately to determine what pre-project monitoring should be initiated.*

**Response:** Staff would support this proposal if it were contained in the final NPDES permit and once-through cooling were actually permitted as the cooling technology for this project.

**RWQCB-4:** *As part of Mirant's General Stormwater Permit for Construction Activities, Mirant will be required to develop a Construction Best Management Plan. In this plan, Mirant will be required to include tasks that would implement measures to minimize disturbance of contaminated areas and to follow proper disposal guidance.*

**Response:** This requirement has been included in **SOIL & WATER-1**.

## **CONCLUSIONS AND RECOMMENDATIONS**

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### **WATER SUPPLY/WASTEWATER DISCHARGE**

A draft NPDES permit is required for evaluation of significant impacts and LORS compliance. Without a draft NPDES permit to review it is not possible to determine if the proposed project design is in compliance or will be able to comply with the NPDES permit provisions. Should the current project design not be able to comply with NPDES permit conditions, a redesign of the project may be required. Such a redesign is not able to be evaluated by staff for LORS compliance, significant impacts, or mitigation in this FSA. There has been no timetable set for the issuance of a revised draft permit, as SFRWQCB staff is awaiting input from concerned agencies and is requiring more information to be submitted by the applicant.

Staff does not consider once-through cooling to be BTA in regards to its CEQA analysis, but the SFRWQCB will make this determination under the Clean Water Act in the NPDES permit. Staff is requiring the project owner to receive an NPDES permit prior to site mobilization in **SOIL & WATER-2**.

### **THERMAL IMPACTS**

The proposed cooling water discharge does not meet the requirements of the California Thermal Plan in that the discharge temperature rise exceeds the 4°F limit established for enclosed bays. Therefore, a waiver of the Thermal Plan requirements is needed and has been requested by the applicant, based on modeling which shows that temperature rises would not exceed 4°F at the water surface. The validity of the applicant's modeling is questioned, and the project's use of the proposed once-through cooling system is dependent on the SFRWQCB issuing a variance for the project, which at this



point is still uncertain. The significance of the potential impacts is discussed in the **Aquatic Biological Resources** section of this FSA.

## **OFFSHORE DREDGING**

Due to the benefit of avoiding all offshore dredging activities and Bay fill, staff recommends that one of the feasible upland cooling technologies be implemented by the project.

## **EROSION AND SEDIMENTATION / STORMWATER**

Staff believes that the proposed Unit 7 project will not result in any significant adverse impacts to soil and water resources with the implementation of Condition of Certification **SOIL & WATER-1** and the proposed mitigation measures.

## **BAY FILL**

The Unit 7 project would create approximately 194,000 square feet of new fill in the San Francisco Bay, resulting from the intake and discharge structures associated with the proposed once-through cooling system. The Bay's various habitats and physical characteristics are being altered and lost due to new development in the Bay. The significant cumulative effects of the Unit 7 project and other development in the Bay will reduce its productivity and diversity. Therefore, staff recommends the use of a feasible upland cooling technology, which would eliminate impacts to the Bay altogether.

The Bay Conservation and Development Commission (BCDC) has expressed concern with the additional Bay fill proposed by the applicant, and staff shares their concern. Accordingly, staff believes that once-through cooling may not be in compliance with the McAteer-Petris Act. BCDC has yet to provide its final recommendation regarding McAteer-Petris Act issues. Should BCDC ultimately recommend an upland alternative to once-through cooling, the Energy Commission could only license a project with once-through cooling if it found the upland alternative to have a greater adverse environmental impact or that the alternatives to bay fill were found to be infeasible. Please refer to the **Aquatic Biological Resources** section of this FSA for more information on this issue.

## **COOLING WATER ALTERNATIVES**

The alternative cooling technologies of wet and dry cooling are proven and feasible. Staff recommends an upland alternative be implemented for the Unit 7 project as mitigation that avoids water-related impacts to the Bay.

## **CONDITIONS OF CERTIFICATION**

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**SOIL & WATER 1:** Prior to site mobilization for the project and any project linear element, the project owner shall obtain Energy Commission staff approval for a Storm Water Pollution Prevention Plan (SWPPP) as required under the General Stormwater Construction Activity Permit for the project. As part of the General Stormwater Permit for Construction Activities, the project owner will need to include a Construction Best Management Plan. In this plan, the project owner will be required to include tasks that would implement measures to minimize

disturbance of contaminated areas and to follow proper disposal guidance. The applicant shall also supply an Erosion and Sediment Control Plan that addresses all project elements.

**Verification:** At least 60 days prior to the start of any site mobilization activities associated with the construction of the project including any project linear element, the project owner will submit a copy of the Storm Water Pollution Prevention Plan (SWPPP), and an Erosion and Sediment Control Plan to the Energy Commission Compliance Project Manager (CPM) for review and approval. Approval of the plans by the Energy Commission CPM must be received prior to the initiation of any site mobilization activities associated with site mobilization of any project element.

**SOIL & WATER 2:** Prior to site mobilization, the project owner shall obtain from the San Francisco Bay Regional Water Quality Control Board (RWQCB) a Final National Pollutant Discharge Elimination System (NPDES) permit for both construction and operation that incorporates the proposed Potrero Unit 7. The project owner shall comply with all provisions of the revised NPDES permit. The project owner shall notify the Energy Commission CPM of any changes to this permit, including any future application for permit renewal.

**Verification:** At least 60 days prior to site mobilization, the project owner shall submit to the Energy Commission CPM copies of the NPDES permits.

**SOIL & WATER 3:** Prior to site mobilization, the project owner shall submit a revised Site Mitigation and Implementation Plan to the SFRWQCB for comment, and to the Energy Commission CPM for review and approval. This plan shall detail the proposed means of disposal of dewatering groundwater and BMPs designed to handle waterborne contaminants. The plan shall also address the amount of excess fill to be produced and provide criteria used for determining the necessity for fill to be hauled to an offsite disposal facility. The plan will be submitted to San Francisco Bay Regional Water Quality Control Board (RWQCB) for review and approval prior to site mobilization. The project owner shall also provide a workplan with details and procedures to be implemented should contaminated soils and/or groundwater be encountered. This work plan will identify how the project owner will address any adverse impacts and the measures to be implemented to mitigate them to less than significant levels. The work plan shall detail the procedures that will be used should any contaminated soils and/or groundwater be encountered during construction.

**Verification:** At least sixty (60) days prior to site mobilization, the project owner shall submit a copy of the revised Site Mitigation and Implementation Plan and a workplan for contaminated soils/groundwater handling to the SFRWQCB for comment and to the Energy Commission CPM for review and approval.

**SOIL & WATER 4:** Prior to any directional boring activities, the project owner/applicant will submit a Frac-Out Contingency Plan (FCP) for staff approval. The plan must include specifications for pre-monitoring in order to determine if the proposed route will cause any adverse impacts during the boring. The plan must provide for remediation in case a frac-out occurs. The plan must include an extensive monitoring program to be implemented during the boring operations. Bentonite slurry should not be reused unless monitoring reveals that the slurry is not coming into contact with contaminated materials. Other

aspects of the plan need to address contact with all agencies that have jurisdiction of Islais Creek to inform them of the proposed boring operation. An agency contact list must be developed and kept onsite. These agencies should be contacted in the event of a frac-out.

**Verification:** Thirty (30) days prior to the direct boring project, the project owner must submit an FCP to the CPM for review and approval. Boring activities may not commence until the plan has been approved by the CPM.

**SOIL & WATER 5:** The project owner shall have an environmental professional (as defined by the American Society for Testing and Materials practice E 1527-97 Standard Practice for Phase I Environmental Site Assessments) available for consultation during excavation activities. If potentially contaminated groundwater is encountered during excavation at the proposed site as evidenced by discoloration, odor, or other signs, prior to any further construction activity at that location, the environmental professional shall inspect the site, determine the need for sampling to confirm the nature and extent of contamination, and file a written report to the project owner and the Energy Commission CPM stating the recommended course of action. If, in the opinion of the environmental professional, significant remediation may be required, the project owner shall contact representatives of the San Francisco Bay Regional Water Quality Control Board for guidance and possible oversight.

**Verification:** At least 30 days prior to the start of site mobilization the project owner shall identify the environmental professional and provide all qualifications to the Energy Commission CPM for approval. Should contaminated sediments and groundwater be identified, the project owner should notify the CPM in writing within 5 days of any reports filed by the environmental professional, and indicate if any contamination has been determined to be present.

**SOIL & WATER 6:** If sewer discharge is selected as the disposal method for dewatering wastewater, the applicant shall prepare a dewatering plan that identifies expected quantities, flowrates, and water quality parameters that satisfy the requirements that pertain to an Industrial Wastewater Discharge Permit from the San Francisco Public Utilities Commission Bureau of Environmental Regulation and Management (BERM). An application, drawings showing locations of discharge, information on wastewater treatment, and a schematic overview of the facility that will generate the wastewater must be submitted to the CPM and to the CCSF BERM.

**Verification:** At least 120 days prior to the planned date of site mobilization (specifically groundwater dewatering discharge to the sewer), the project owner shall submit a dewatering plan and an Industrial Wastewater Discharger Permit application to the CPM for review and approval and to the CCSF BERM for comment.

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# **WORKER SAFETY AND FIRE PROTECTION**

Testimony of Alvin J. Greenberg, Ph.D. and Rick Tyler

## **INTRODUCTION**

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Worker safety and fire protection is legislated by laws, ordinances, regulations, and standards (LORS), and enforced through regulations codified at the Federal, State, and local levels. Worker safety is of utmost priority at the project location and is documented through worker safety practices and training. Industrial workers at the facility operate process equipment and handle hazardous materials daily and may face hazards that can result in accidents and serious injury. Protection measures are employed to either eliminate these hazards or minimize the risk through special training, protective equipment or procedural controls.

The purpose of this analysis is to assess the worker safety and fire protection measures proposed by the Potrero Power Plant Unit 7 Project (Unit 7) and to determine whether the applicant has proposed adequate measures to:

- comply with applicable safety LORS;
- protect the workers during construction and operation of the facility;
- protect against fire; and
- provide adequate emergency response procedures.

## **LAWS, ORDINANCES, REGULATIONS AND STANDARDS (LORS)**

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### **FEDERAL**

In December 1970 Congress enacted Public Law 91-596, the Federal Occupational Safety and Health Act of 1970. This Act mandates safety requirements in the workplace and is found in Title 29 of the United States Code, § 651 (29 U.S.C. §§ 651 through 678). Implementing regulations are codified at Title 29 of the Code of Federal Regulations, under General Industry Standards §§ 1910.1 - 1910.1500 and clearly define the procedures for promulgating regulations and conducting inspections to implement and enforce safety and health procedures to protect workers, particularly in the industrial sector. Most of the general industry safety and health standards now in force under this OSH Act represent a compilation of materials from existing federal standards and national consensus standards. These include standards from the voluntary membership organizations of the American National Standards Institute (ANSI) and the National Fire Protection Association (NFPA), which publishes the National Fire Codes.

The purpose of the Occupational Safety and Health Act is to “assure so far as possible every working man and woman in the nation safe and healthful working conditions and to preserve our human resources,” (29 USC § 651). The Federal Department of Labor promulgates and enforces safety and health standards that are applicable to all businesses affecting interstate commerce. The Department of Labor established the



Occupational Safety and Health Administration (OSHA) in 1971 to discharge the responsibilities assigned by the OSH Act.

Applicable Federal requirements include:

- 29 U.S. Code § 651 et seq. (Occupational Safety and Health Act of 1970);
- 29 CFR §1910.1 - 1910.1500 (Occupational Safety and Health Administration Safety and Health Regulations);
- 29 CFR §1952.170 – 1952.175 (Federal approval of California's plan for enforcement of its own Safety and Health requirements, in lieu of most of the Federal requirements found in 29 CFR §1910.1 – 1910.1500).

## STATE

California passed the Occupational Safety and Health Act of 1973 ("Cal/OSHA") as published in the California Labor Code § 6300. Regulations promulgated as a result of the Act are codified at Title 8 of the California Code of Regulations, beginning with §337-560 and continuing with §1514 through 8568. The California Labor Code requires that the Cal/OSHA Standards Board adopt standards at least as effective as the federal standards (Labor Code § 142.3(a)) and thus all Cal/OSHA health and safety standards meet or exceed the Federal requirements. Hence, California obtained federal approval of its State health and safety regulations, in lieu of the federal requirements published at 29 CFR §1910.1 - 1910.1500). The Federal Secretary of Labor, however, continually oversees California's program and will enforce any federal standard for which the State has not adopted a Cal/OSHA counterpart.

Under OSHA regulations, employers are responsible for informing their employees about workplace hazards, potential exposure and the work environment (Labor Code § 6408). Cal/OSHA's principal tool in ensuring that workers and the public are informed is the Hazard Communication standard first adopted in 1981 (8 CCR §5194). It was later revised to mirror the Federal Hazard Communication Standard (29 CFR §1910.1200) which established on the federal level an employee's "right to know" about chemical hazards in the workplace, but added the provision of applicability to public sector employers. A major component of this regulation is the required provision of Material Safety Data Sheets (MSDSs) to workers. MSDSs provide information on the identity, toxicity, and precautions to take when using or handling hazardous materials in the workplace.

8 CCR §3203 requires that employers establish and maintain a written Injury and Illness Prevention Program to identify workplace hazards and communicate them to its employees through a formal employee-training program.

Applicable State requirements include:

- 8 CCR §339 - List of hazardous chemicals relating to the Hazardous Substance Information and Training Act;
- 8 CCR §337, et seq. Cal/OSHA regulations;
- 24 CCR § 3, et seq. - incorporates the current addition of the Uniform Building Code;

- Health and Safety Code § 25500, et seq. - Risk Management Plan requirements for threshold quantity of listed acutely hazardous materials at the facility;
- Health and Safety Code § 25500 - 25541 - Hazardous Material Business Plan detailing emergency response plans for hazardous materials emergency at the facility.

## **LOCAL**

The California Building Standards Code published at Title 24 of the California Code of Regulations § 3 et seq is comprised of eleven parts containing the building design and construction requirements relating to fire and life safety and structural safety. The Building Standards Code includes the electrical, mechanical, energy, and fire codes applicable to the project. Local planning/building & safety departments enforce the California Uniform Building Code.

National Fire Protection Association (NFPA) standards are published in the California Fire Code. The fire code contains general provisions for fire safety, including but not restricted to: 1) required road and building access; 2) water supplies; 3) installation of fire protection and life safety systems; 4) fire-resistive construction; 5) general fire safety precautions; 6) storage of combustible materials; 7) exits and emergency escapes; and 8) fire alarm systems. The California Fire Code reflects the body of regulations published at Part 9 of Title 24 (H&S Code §18901 et seq.) pertaining to the California Fire Code.

Similarly, the Uniform Fire Code (UFC) Standards, a companion publication to the California Fire Code, contains standards of the American Society for Testing and Materials and the NFPA. It is the United State's premier model fire code. It is updated annually as a supplement and published every third year by the International Fire Code Institute to include all approved code changes in a new edition. The San Francisco Fire Code consists primarily of the 1997 Edition of the Uniform Fire Code. The San Francisco Fire Code was adopted by Ordinance 141-99, File Number 990716. It was approved on November 5, 1999 with an effective date of July 1, 1999. The Fire Code was last amended by Ordinance 322-00, File Number 001917. It was approved on December 28, 2000, with an effective date of July 16, 2000.

Applicable local (or locally enforced) requirements include:

- 1998 Edition of California Fire Code and all applicable NFPA standards (24 CCR Part 9);
- California Building Code Title 24, California Code of Regulations (24 CCR § 3, et seq.).
- Uniform Fire Code, 1997

## **SETTING**

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The Potrero Power Plant Unit 7 site is located in the southwest portion of the existing Potrero Power Plant in the City and County of San Francisco. The proposed project will be situated wholly within the confines of an existing and active power generating facility

and as such, fire protection systems and worker safety programs already exist and are in place. Current land uses in the site vicinity include mostly industrial with some commercial uses. Fire support services to the site will be under the jurisdiction of the San Francisco Fire Department (SFFD). SFFD Station 25 is located approximately 0.9 miles south of the facility at the corner of 3rd and Cargo Streets. This is the closest station to the site and is assigned as the off-site first responder to the Unit 7 project. Response time is estimated to be approximately 3-4 minutes (SFFD 2001).

Station 25 does not have HAZMAT capabilities. SFFD Station 36, located at 109 Oak Street, is the assigned hazmat first responder. Response time for Station 36 is estimated to be 6-7 minutes. Station 36 has 24-hour hazmat capabilities, a hazmat engine and four hazmat personnel. In a hazmat situation, both Station 25 and Station 36 are dispatched (SFFD 2001).

## **IMPACTS**

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### **WORKER SAFETY**

Industrial environments are potentially dangerous, during both construction and operation of facilities. Workers at the proposed project will be exposed to loud noises, moving equipment, trenches, and confined space entry and egress problems. The workers may experience falls, trips, burns, lacerations, and numerous other injuries. They have the potential to be exposed to falling equipment or structures, chemical spills, hazardous waste, fires, explosions, and electrical sparks and electrocution. It is important for the Unit 7 project to have well-defined policies and procedures, training, and hazard recognition and control at their facility to minimize such hazards and protect workers. If the facility complies with all LORS, workers will be adequately protected from health and safety hazards.

### **FIRE HAZARDS**

During construction and operation of the proposed Unit 7 project, there will be the potential for both small fires and major structural fires. Electrical sparks, combustion of fuel oil, natural gas or flammable liquids, explosions, and over-heated equipment, have the potential to cause small fires. Major structural fires may develop from uncontrolled fires or be caused by large explosions of natural gas or other flammable gasses or liquids. Compliance with all LORS will be adequate to assure protection from all fire hazards.

### **CUMULATIVE IMPACTS**

Staff reviewed the potential for the construction and operation of the proposed Unit 7 project, combined with existing industrial facilities, to result in impacts on the fire and emergency service capabilities of the San Francisco Fire Department and found that cumulative impacts were insignificant.

## APPLICANT'S PROPOSED MITIGATION

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### WORKER SAFETY

A Safety and Health Program will be prepared by the applicant to minimize worker hazards during construction and operation. Staff uses the phrase "Safety and Health Program" to refer to the measures that will be taken to ensure compliance with the applicable LORS during the construction and operational phases of the project.

#### **Construction Safety and Health Program**

The Unit 7 project encompasses construction and operation of a 540-MW electric power generating unit and supporting infrastructure. Workers will be exposed to hazards typical of construction and operation of a gas-fired combined cycle facility. Remediation of contamination present within the area of construction will be performed during the initial construction phase of Unit 7.

Construction Safety Orders are published at 8 CCR § 1502, et seq. These requirements are promulgated by Cal/OSHA and are applicable to the construction phase of the project. The Construction Safety and Health Program must include the following:

- Construction Injury and Illness Prevention Program (8 CCR § 1509);
- Construction Fire Protection and Prevention Plan (8 CCR § 1920); and
- Personal Protective Equipment Program (8 CCR §§ 1514 - 1522).

Additional programs under General Industry Safety Orders (8 CCR §§ 3200 - 6184), Electrical Safety Orders (8 CCR §§ 2299 - 2974) and Unfired Pressure Vessel Safety Orders (8 CCR §§ 450 - 544) will include:

- Electrical Safety Program;
- Unfired Pressure Vessel Safety Orders;
- Equipment Safety Program;
- Forklift Operation Program;
- Excavation/Trenching Program;
- Fall Prevention Program;
- Scaffolding/Ladder Safety Program;
- Articulating Boom Platforms Program;
- Crane and Material Handling Program;
- Housekeeping and Material Handling and Storage Program;
- Hot Work Safety Program;
- Respiratory Protection Program;
- Employee Exposure Monitoring Program;

- Confined Space Entry Program;
- Hand and Portable Power Tool Safety Program;
- Hearing Conservation Program;
- Back Injury Prevention Program;
- Hazard Communication Program;
- Air Monitoring Program;
- Heat and Cold Stress Monitoring and Control Program; and
- Pressure Vessel and Pipeline Safety Program.

The AFC includes adequate outlines of each of the above programs. Prior to construction of the Unit 7 project, detailed programs and plans must be provided pursuant to the condition of certification WORKER SAFETY-1.

### **Operations and Maintenance Safety and Health Program**

Upon completion of construction and prior to commencing operations at the Unit 7 project, the Operations and Maintenance Safety and Health Program must be prepared. This operational safety program must include the following programs and plans:

- Injury and Illness Prevention Program (8 CCR § 3203);
- Emergency Action Plan (8 CCR § 3220);
- Hazardous Materials Management Program;
- Operations and Maintenance Safety Program;
- Fire Protection and Prevention Program (8 CCR § 3221); and
- Personal Protective Equipment Program (8 CCR § 3380-3400 for industrial operations and 8 CCR §§ 3401-3411 for on-site fire brigades).

In addition, the requirements under General Industry Safety Orders (8 CCR §§ 3200 - 6184), Electrical Safety Orders (8 CCR §§ 2299 - 2974) and Unfired Pressure Vessel Safety Orders (8 CCR §§ 450 - 544) will be applicable to the project. Written safety programs, which the applicant must develop, for the Unit 7 project will ensure compliance with the above-mentioned requirements.

The AFC includes adequate outlines of the Emergency Action Plan (AFC Table 8.7-3), the Construction Training Program Plan (AFC Table 8.7-4), and the Operations and Maintenance Training Program Plan (AFC Table 8.7-5). Prior to operation of the Unit 7 project, all detailed programs and plans will be provided pursuant to condition of certification WORKER SAFETY-2.

### **Safety and Health Program Elements**

The applicant provided the proposed outlines for both a Construction Safety and Health Program and an Operations Safety and Health Program. The measures in these programs are derived from applicable sections of state and federal law. The major elements required in the two programs are as follows:

## **Injury and Illness Prevention Program (IIPP)**

The AFC (page 8.7-7) contains a brief outline of the contents of this program which is adequate for staff's analysis but which must be expanded prior to construction and operations (see proposed Conditions of Certification **WORKER SAFETY-1 and 2**). The applicant will submit this expanded Construction and Operations Illness and Injury Prevention Program to Cal/OSHA for review and comment 30 days prior to both construction and operation of the project.

The IIPP will include the following components as presented in the AFC:

- Identity of person(s) with authority and responsibility for implementing the program;
- System ensuring employees comply with safe and healthy work practices;
- System facilitating employer-employee communications;
- Procedures identifying and evaluating workplace hazards, including inspections to identify hazards and unsafe conditions;
- Methods for correcting unhealthy/unsafe conditions in a timely manner;
- Methods of documenting inspections and training and for maintaining records; and
- A training program for:
  - - introducing the program;
  - - new, transferred, or promoted employees;
  - - new processes and equipment;
  - - supervisors;
  - - contractors.

## **Emergency Action Plan**

California regulations require an Emergency Action Plan (8 CCR § 3220). The AFC contains a satisfactory outline for an emergency action plan (Table 8.7-3).

The outline lists the following features:

- Purpose and Scope of Emergency Action Plan;
- Personnel Responsibilities during Emergencies;
- Specific Response Procedures;
- Evacuation Plan;
- Emergency Equipment Locations;
- Fire Extinguisher Locations;
- Site Security;
- Accident Reporting and Investigation;
- Lockout/Tag out;
- Hazard Communication;

- Spill Containment and Reporting;
- First Aid and Medical Response;
- Respiratory Protection;
- Personal Protective Equipment;
- Sanitation; and
- Work Site Inspections.

### **Fire Prevention Plan (Operations)**

California Code of Regulations requires an Operations Fire Prevention Plan (8 CCR § 3221). The AFC describes a proposed fire prevention plan which is acceptable to staff. The plan will include the following topics:

Responsibilities;

- Procedures for fire control;
- Fixed and Portable fire-fighting equipment;
- Housekeeping;
- Employee alarm/communication practices;
- Servicing and refueling areas;
- Training; and
- Flammable and combustible liquid storage.

Staff proposes that the Applicant submit a final Fire Protection and Prevention Plan to the Energy Commission Compliance Project Manager (CPM) and the San Francisco Fire Department for review and approval to satisfy proposed conditions of certification

### **WORKER SAFETY 1 and 2.**

### **Personal Protective Equipment Program**

California regulations require Personal Protective Equipment (PPE) and first aid supplies whenever hazards are encountered which, due to process, environment, chemicals or mechanical irritants can cause injury or impair bodily function as a result of absorption, inhalation or physical contact (8 CCR § 3380-3400). The Unit 7 project operational environment will likely require PPE.

The outline and discussion in the AFC (page 8.7-8) concerning PPE demonstrates that an adequate PPE program will be established. The AFC indicates that all employees required to use PPE will be checked for proper fit and to ensure that they are medically capable of wearing the equipment. All safety equipment must meet NIOSH or ANSI standards and will carry markings, numbers, or certificates of approval. Respirators must meet NIOSH and California Department of Health and Human Services Standards. Each employee must be provided with the following information pertaining to the protective clothing and equipment:

- Proper use, maintenance, and storage;

- When the protective clothing and equipment are to be used;
- Benefits and limitations; and
- When and how the protective clothing and equipment are to be replaced.

The PPE Program ensures that employers comply with the applicable requirements for PPE and provide employees with the information and training necessary to implement the program.

### **Operations and Maintenance Written Safety Program**

In addition to the specific plans listed above, "safe work practices" are required by various Cal/OSHA regulations. Both the Construction and the Operations Safety Programs address safe work practices under a variety of programs. The components of these programs include the following:

- Fall Protection Program;
- Hot Work Safety Program;
- Confined Space Entry;
- Hearing Conservation Program;
- Hazard Communication Program;
- Process Safety Management (PSM) Program; and
- Contractor Safety Program.

### **Operations and Maintenance Safety Training Programs**

Employees will be trained in the safe work practices described in the above-reference safety programs.

### **Fire Protection**

Staff reviewed the information provided in the AFC regarding available fire protection services and equipment (AFC Section 8.7 Worker Safety and Health) to determine if the project would adequately protect workers and if it would affect the fire protection services in the area. The project will rely on both onsite fire protection systems and local fire protection services. The onsite fire protection system provides the first line of defense for small fires. In the event of a major fire, fire support services including trained firefighters and equipment for a sustained response would be required by the San Francisco Fire Department. The SFFD states that they are adequately equipped and staffed to respond to such an event (SFFD 2001).

The information in the AFC indicates that the project intends to meet the minimum fire protection and suppression requirements. Elements include both fixed and portable fire extinguishing systems. The fire water supply (the San Francisco Bay) and an on-site electric fire-water pumping system (with diesel generator back-up) will provide more than an adequate quantity of fire-fighting water to yard hydrants, hose stations, and water spray and sprinkler systems. The motor driven fire pump will be capable of supplying maximum water demand for any automatic sprinkler system plus water for fire hydrants and hose stations.



A carbon dioxide fire protection system will be provided for the combustion turbine generator (CTG) and accessory equipment. Fire detection sensors will also be installed.

Fire hydrants and hose stations will be placed at approximately 300-foot intervals around the proposed facility as per NFPA 24 guidance.

In addition to the fixed fire protection system, smoke detectors, combustible gas detectors, and portable extinguishers will be located throughout the plant with size, rating, and spacing in accordance with the Uniform Fire Code.

The applicant will be required to provide the final Fire Protection and Prevention Program to staff and to the San Francisco Fire Department, prior to construction and operation of the project, to confirm the adequacy of the proposed fire protection measures.

## **FACILITY CLOSURE**

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The project owner/operator is responsible for maintaining an operational fire protection system during closure activities. The project must also stay in compliance with all applicable health and safety LORS during that time. A facility closure plan must be developed at least one year prior to closure to incorporate these requirements, and submitted to the Energy Commission Compliance Project Manager for approval.

## **RESPONSE TO PUBLIC AND AGENCY COMMENTS ON THE PSA**

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### **DEPARTMENT OF TOXIC SUBSTANCE CONTROL (DTSC)**

**DTSC- 2 and 12:** The Site Health and Safety Plan should address the potential for workers to come into contact with contaminated groundwater, and if so, evaluate potential worker health and safety issues.

**Response:** Staff has proposed an additional Condition of Certification to ensure that the Site Health and Safety Plan will provide for adequate and appropriate protection of workers should contaminated groundwater or soil be found to exist on the site during demolition and construction activities.

## **CONCLUSION AND RECOMMENDATIONS**

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### **CONCLUSIONS**

If the applicant for the proposed Unit 7 project provides a Project Construction Injury and Illness Prevention Program which is 1 of 25 required programs and a Project Operations Maintenance Safety and Health Program as required by conditions of certification **WORKER SAFETY 1 and 2**, staff believes that the project will incorporate sufficient measures to ensure adequate levels of industrial safety, and comply with applicable LORS. Staff also concludes that the proposed plant will not have significant

impacts on local fire protection services. The proposed facility is located within an area that is currently served by the local fire department. The fire risks of the proposed facility are similar to those of existing facilities in the immediate vicinity and thus pose no significant added demands on local fire protection services.

## **RECOMMENDATIONS**

If the Commission certifies the project, staff recommends that the Commission adopt the following proposed conditions of certification. The proposed conditions of certification provide assurance that the Construction Injury and Illness Prevention Program and the Operations Safety and Health Program proposed by the applicant will be reviewed by the appropriate agencies before implementation. The conditions also require verification that the proposed plans adequately assure worker safety and fire protection and comply with applicable LORS.

## **PROPOSED CONDITIONS OF CERTIFICATION**

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**WORKER SAFETY-1** The project owner shall submit to the CPM a copy of the Project Construction Injury and Illness Prevention Program, containing the following:

- A Construction Safety Program;
- A Construction Personal Protective Equipment Program;
- A Construction Exposure Monitoring Program;
- A Construction Emergency Action Plan; and
- A Construction Fire Protection and Prevention Plan.

The Safety Program, the Personal Protective Equipment Program, and the Exposure Monitoring Program shall be submitted to the CPM for review and comment concerning compliance of the program with all applicable Safety Orders. The Construction Fire Protection and Prevention Plan and Emergency Action Plan shall be submitted to the of San Francisco Fire Department for review and comment prior to submittal to the CPM.

**Verification:** At least 30 days prior to the start of construction, the project owner shall submit to the CPM for review and approval a copy of the Project Construction Injury and Illness Prevention Program. The project owner shall provide a letter from the San Francisco Fire Department stating that they have reviewed and commented on the Construction Fire Protection and Prevention Plan Emergency Action Plan. Comments shall be included in the submittal to the CPM along with details ensuring compliance with any recommended changes.

**WORKER SAFETY-2** The project owner shall submit to the CPM a copy of the Project Operations and Maintenance Safety and Health Program containing the following:

- an Operation Injury and Illness Prevention Plan;
- an Emergency Action Plan;

- Hazardous Materials Management Program;
- Operations and Maintenance Safety Program;
- Fire Protection and Prevention Program (8 CCR § 3221); and;
- Personal Protective Equipment Program (8 CCR §§ 3401-3411).

The Operation Injury and Illness Prevention Plan, Emergency Action Plan, and Personal Protective Equipment Program shall be submitted to the Cal/OSHA Consultation Service, for review and comment concerning compliance of the program with all applicable Safety Orders. The Operation Fire Protection Plan and the Emergency Action Plan shall also be submitted to the City of San Francisco Fire Department for review and acceptance.

**Verification:** At least 30 days prior to the start of operation, the project owner shall submit to the CPM a copy of the final version of the Project Operations and Maintenance Safety & Health Program. It shall incorporate Cal/OSHA Consultation Service's comments, stating that they have reviewed and accepted the specified elements of the proposed Operations and Maintenance Safety and Health Plan.

**WORKER SAFETY –3** The project owner shall have an environmental professional available for consultation during soil excavation and construction activities. (See **WASTE MANAGEMENT** section for qualifications of this professional.) This person shall evaluate potential contact with contaminated soil or groundwater and address worker health and safety issues in the Site Health and Safety Plan.

**Verification:** At least 30 days prior to the start of site preparation, the project owner shall submit to the CPM a copy of the final version of Site Safety and Health Plan. The Plan shall incorporate actions to be taken to protect workers if the potential exists for contact with contaminated soils or groundwater.

## REFERENCES

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1998 California Fire Code. Published by the International Fire Code Institute comprised of the International Conference of Building Officials, the Western Fire Chiefs Association, and the California Building Standards Commission. Whittier, Ca.

1997 Uniform Fire Code, Vol. 1. Published by the International Fire Code Institute comprised of the International Conference of Building Officials and the Western Fire Chiefs Association, Whittier, Ca.

San Francisco Fire Department (SFFD). 2001. Personal communication with Lieutenant Tony Rousso, Station 25. April 10, 2001.

# FACILITY DESIGN

Testimony of Brian Payne

## INTRODUCTION

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Facility Design encompasses the civil, structural, mechanical and electrical engineering design of the project. The purpose of the Facility Design analysis is to:

- verify that the laws, ordinances, regulations and standards (LORS) applicable to the engineering design and construction of the project have been identified;
- verify that the project and ancillary facilities have been described in sufficient detail, including proposed design criteria and analysis methods, to provide reasonable assurance that the project can be designed and constructed in accordance with all applicable engineering LORS, and in a manner that assures public health and safety;
- determine whether special design features should be considered during final design to deal with conditions unique to the site which could influence public health and safety; and
- describe the design review and construction inspection process and establish Conditions of Certification that will be used to monitor and ensure compliance with the intent of the engineering LORS and any special design requirements.

## SUBJECTS DISCUSSED

Subjects discussed in this analysis include:

- Identification of the engineering LORS applicable to facility design;
- Evaluation of the applicant's proposed design criteria, including the identification of those criteria that are essential to ensuring public health and safety;
- Proposed modifications and additions to the Application for Certification (AFC) that are necessary to comply with applicable engineering LORS; and
- Conditions of Certification proposed by staff to ensure that the project will be designed and constructed to assure public health and safety and comply with all applicable engineering LORS.

## SETTING

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The applicant, Mirant, proposes to construct and operate the new 540 megawatt (MW) Potrero Power Plant Unit 7 Project (Unit 7). This plant is proposed for construction at the existing Potrero Power Plant, which is located in San Francisco, just south of the central business district, adjacent to the San Francisco Bay. This facility is proposed to be a natural gas fired, combined cycle combustion turbine facility (SECAL 2000a). For more information on the site and related project description, please see **Project Description**.

The site lies in seismic zone 4, the zone of greatest seismic shaking in the United States. Additional engineering design details are contained in the Application for Certification (AFC), Volume II, Appendix E (SECAL 2000a).

## **LAWS, ORDINANCES, REGULATIONS AND STANDARDS (LORS)**

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The applicable LORS for each engineering discipline (civil, structural, mechanical and electrical) are described in the following sections of the AFC, Volume II, Appendices (SECAL 2000a ).

- Civil Engineering – Appendix E1
- Structural and Seismic Engineering – Appendix E2
- Electrical Engineering – Appendix E3
- Chemical Engineering – Appendix E4
- Mechanical Engineering – Appendix E5
- System Control Engineering – Appendix E6

Some of these LORS include; California Building Code (CBC), American National Standards Institute (ANSI), American Society of Mechanical Engineers (ASME), American Society for Testing and Materials (ASTM) and American Boiler Manufacturers Association (ABMA).

## **ANALYSIS**

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The basis of this analysis is the applicant's proposed analysis and construction methods and list of engineering LORS and design criteria set forth in the AFC.

## **SITE PREPARATION AND DEVELOPMENT**

Staff has evaluated the proposed design criteria for grading, flood protection, erosion control, site drainage, and site access. Staff has assessed the criteria for designing and constructing linear support facilities such as a natural gas pipeline and electric transmission line. The applicant proposes to use accepted industry standards (see AFC Section 10.0 and Appendix E for a representative list of applicable industry standards), design practices, and construction methods in preparing and developing the site. Staff concludes that the project, including its linear facilities, will likely comply with all applicable site preparation LORS, and proposes Conditions of Certification (see below and the **Geology and Paleontology** section of this document) to ensure compliance.

## **MAJOR STRUCTURES, SYSTEMS AND EQUIPMENT**

Major structures, systems and equipment are defined as those structures and associated components or equipment that are necessary for power production and are costly to repair or replace, that require a long lead time to repair or replace, or that are used for the storage, containment, or handling of hazardous or toxic materials. Major structures and equipment will be identified through compliance with proposed Condition of Certification **GEN-2** (below).

The AFC contains lists of the civil, structural, mechanical and electrical design criteria that demonstrate the likelihood of compliance with applicable engineering LORS, and that staff believes are essential to ensuring that the project is designed in a manner that protects public health and safety.

The project shall be designed and constructed to the 1998 edition of the California Building Code (CBC), and other applicable codes and standards in effect at the time design and construction of the project actually commence. In the event the initial designs are submitted to the Chief Building Official (CBO) for review and approval when the successor to the 1998 CBC is in effect, the 1998 CBC provisions, identified herein, shall be replaced with the applicable successor provisions.

Certain structures in a power plant may be required, under the CBC, to undergo dynamic lateral force (structural) analysis; others may be designed using the simpler static analysis procedure. In order to ensure that structures are analyzed using the appropriate lateral force procedure, staff has included Proposed Condition of Certification **STRUC-1** (below), which in part requires review and approval by the CBO of the project owner's proposed lateral force procedures prior to the start of construction.

## **NATURAL GAS PIPELINE**

An existing Pacific Gas and Electric Company (PG&E) natural gas pipeline will be used to furnish gas to the site. (If the proposed Golden Gate II project is constructed, PG&E will be required to upgrade the existing natural gas pipeline in order to meet the demands of both power plants.) This line is operated and maintained by PG&E in accordance with U.S. Department of Transportation (DOT), Title 49, Code of Federal Regulations (CFR) Chapter 1, Part 192 "Transportation of Natural and other Gas by Pipeline: Minimum Federal Safety Standards," and the California Public Utilities Commission, General Order 112-E (CPUC GO 112-E). Compliance with these requirements will help mitigate the impacts of pipeline rupture by ensuring proper operation and maintenance of the existing line. Therefore, no mitigation beyond a pipeline operated and maintained to applicable regulations is necessary.

## **PROJECT QUALITY PROCEDURES**

The AFC (SECAL 2000a, § 2.4.6) describes a Project Quality Program that will be used on the project to maximize confidence that systems and components will be designed, fabricated, stored, transported, installed, and tested in accordance with the technical codes and standards appropriate for a power plant. Compliance with design requirements will be verified through an appropriate program of inspections and audits. Employment of this Quality Assurance/Quality Control (QA/QC) program will ensure that the project is actually designed, procured, fabricated and installed as contemplated in this analysis.

## **COMPLIANCE MONITORING**

Under Section 104.2 of the CBC, the building official is authorized and directed to enforce all the provisions of the CBC. For all energy facilities certified by the Energy Commission, the Energy Commission is the building official and has the responsibility to enforce the code. In addition, the Energy Commission has the power to render

interpretations of the CBC and to adopt and enforce rules and supplemental regulations to clarify the application of the CBC's provisions.

The Energy Commission's design review and construction inspection process is developed to conform to CBC requirements and ensure that all facility design Conditions of Certification are met. As provided by Section 104.2.2 of the CBC, the Energy Commission appoints experts to carry out the design review and construction inspections and act as delegate CBO on behalf of the Energy Commission. These delegates typically include the local building official and/or independent consultants hired to cover technical expertise not provided by the local official. The applicant, through permit fees as provided by CBC Sections 107.2 and 107.3, pays the costs of the reviews and inspections. While building permits in addition to the Energy Commission certification are not required for this project, in lieu permit fees are paid by the applicant consistent with CBC Section 107, to cover the costs of reviews and inspections.

Engineering and compliance staff will invite the local building authority, either the City of San Francisco or San Francisco County, or a third party engineering consultant, to act as CBO for the project. When an entity has been identified to perform the duties of CBO, Energy Commission staff will complete a Memorandum of Understanding (MOU) with that entity that outlines its roles and responsibilities and those of its subcontractors and delegates.

Staff has developed proposed Conditions of Certification to ensure public health and safety and compliance with engineering design LORS. Some of these conditions address the roles, responsibilities and qualifications of the applicant's engineers responsible for the design and construction of the project (proposed Conditions of Certification **GEN-1** through **GEN-9**). Engineers responsible for the design of the civil, structural, mechanical, and electrical portions of the project are required to be registered in California, and to sign and stamp each submittal of design plans, calculations, and specifications submitted to the CBO. These conditions require that no element of construction subject to CBO review and approval shall proceed without prior approval from the CBO. They also require that qualified special inspectors be assigned to perform or oversee special inspections required by the applicable LORS.

While the Energy Commission and delegate CBO have the authority to allow some flexibility in scheduling construction activities, these conditions are written to require that no element of construction of permanent facilities subject to CBO review and approval, which would be difficult to reverse or correct, may proceed without prior approval of plans by the CBO. For those elements of construction that are not difficult to reverse and are allowed to proceed without approval of the plans, the applicant shall bear the responsibility to fully modify those elements of construction to comply with all design changes that result from the CBO's plan review and approval process.

## **FACILITY CLOSURE**

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The removal of a facility from service, or decommissioning, as a result of the project reaching the end of its useful life, may range from "mothballing" to removal of all

equipment and appurtenant facilities and restoration of the site. Future conditions that may affect the decommissioning decision are largely unknown at this time.

In order to assure that decommissioning of the facility will be completed in a manner that is environmentally sound, safe, and will protect public health and safety, the applicant shall submit a decommissioning plan to the Energy Commission for review and approval prior to the commencement of decommissioning. The plan shall include a discussion of the following items:

- proposed decommissioning activities for the project and all appurtenant facilities constructed as part of the project;
- all applicable LORS, local/regional plans, and the conformance of the proposed decommissioning activities to the applicable LORS and local/regional plans;
- the activities necessary to restore the site if the plan requires removal of all equipment and appurtenant facilities; and
- decommissioning alternatives, other than complete site restoration.

The above requirements should serve as adequate protection, even in the unlikely event of project abandonment. Staff has proposed general conditions (see **General Conditions**) to ensure that these measures are included in the Facility Closure plan.

## COMMENTS ON THE PSA

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No comments were received on the facility design section of the Preliminary Staff Assessment.

## CONCLUSIONS AND RECOMMENDATIONS

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### CONCLUSIONS

1. The laws, ordinances, regulations, and standards (LORS) identified in the AFC and supporting documents are those applicable to the project.
2. Staff has evaluated the proposed engineering LORS, design criteria and design methods in the record, and concludes that the design, construction and eventual closure of the project are likely to comply with applicable engineering LORS.
3. The Conditions of Certification proposed will ensure that the proposed facilities are designed and constructed in accordance with applicable engineering LORS. This will occur through the use of design review, plan checking and field inspections, which are to be performed by the CBO or other Energy Commission delegate. Staff will audit the CBO to ensure satisfactory performance.
4. Whereas future conditions that may affect decommissioning are largely unknown at this time, it can reasonably be concluded that if the project owner submits a decommissioning plan as required in the General Conditions portion of this



document prior to the commencement of decommissioning, the decommissioning procedure is likely to occur in compliance with all applicable engineering LORS.

## RECOMMENDATIONS

Energy Commission staff recommends that:

1. The Conditions of Certification proposed herein be adopted to ensure that the project is designed and constructed to assure public health and safety, and to ensure compliance with all applicable engineering LORS;
2. The project be designed and built to the 1998 CBC (or successor standard, if such is in effect when the initial project engineering designs are submitted for review); and
3. The CBO shall review the final designs, conduct plan checking and perform field inspections during construction, and Energy Commission staff shall audit and monitor the CBO to ensure satisfactory performance.

## CONDITIONS OF CERTIFICATION

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**GEN-1** The project owner shall design, construct and inspect the project in accordance with the 1998 California Building Code (CBC) and all other applicable LORS in effect at the time initial design plans are submitted to the CBO for review and approval. (The CBC in effect is that edition that has been adopted by the California Building Standards Commission and published at least 180 days previously.) All transmission facilities (lines, switchyards, switching stations, and substations) are handled in Conditions of Certification in the **Transmission System Engineering** section of this document.

Protocol: In the event that the initial engineering designs are submitted to the CBO when a successor to the 1998 CBC is in effect, the 1998 CBC provisions identified herein shall be replaced with the applicable successor provisions. Where, in any specific case, different sections of the code specify different materials, methods of construction, or other requirements, the most restrictive shall govern. Where there is a conflict between a general requirement and a specific requirement, the specific requirement shall govern.

**Verification:** Within 30 days after receipt of the Certificate of Occupancy, the project owner shall submit to the California Energy Commission Compliance Project Manager (CPM) a statement of verification, signed by the responsible design engineer, attesting that all designs, construction, installation and inspection requirements of the applicable LORS and the Energy Commission's Decision have been met in the area of facility design. The project owner shall provide the CPM a copy of the Certificate of Occupancy within 30 days of receipt from the CBO [1998 CBC, Section 109 – Certificate of Occupancy].

**GEN-2** Prior to submittal of the initial engineering designs for CBO review, the project owner shall furnish to the CPM and to the CBO a schedule of facility design submittals, a Master Drawing List, and a Master Specifications List. The

schedule shall contain a list of proposed submittal packages of designs, calculations, and specifications for major structures and equipment. To facilitate audits by Energy Commission staff, the project owner shall provide specific packages to the CPM when requested.

**Verification:** At least 60 days (or a lesser number of days mutually agreed to by the project owner and the CBO) prior to the start of rough grading, the project owner shall submit to the CBO and to the CPM the schedule, the Master Drawing List, and the Master Specifications List of documents to be submitted to the CBO for review and approval. These documents shall be the pertinent design documents for the major structures and equipment listed in Table 1 below. Major structures and equipment shall be added to or deleted from the Table only with CPM approval. The project owner shall provide schedule updates in the Monthly Compliance Report.

**Table 1: Major Structures and Equipment List**

<b>Equipment/System</b>	<b>Quantity (Plant)</b>
Combustion Turbine (CT) Foundation and Connections	2
Steam Turbine (ST) Foundation and Connections	1
Combustion Turbine Generator Foundation and Connections	2
Steam Turbine Generator Foundation and Connections	1
Heat Recovery Steam Generator (HRSG) Structure, Foundation and Connections	2
Station Service Transformer Foundation and Connections	2
Auxiliary Service Transformer Foundation and Connections	1
CT and ST Building Structure Shell and Facade, Foundation and Connections	1
CT Inlet Air Plenum Structure, Foundation and Connections	2
Inlet Air Evaporative Cooler Structure, Foundation and Connections	2
HRSG Exhaust Stack, Foundation and Connections	2
Isolated Phase Bus Duct	2
HRSG Transition Duct from CTG — Structure	2
HRSG Blowdown Tank, Foundation, and Connections	1
CEM Building	1
Electrical/Control Center	2
Condenser Structure, Foundation and Connections	1
Feed Water Pump Foundation and Connections	4
Feed Water Treatment Trailer Foundation and Connections	1 Lot
Feed Water Transformer Foundation and Connections	1 Lot
Phosphate Feed Pump Skid Foundation and Connections	1
Condensate Recirculation Pump Foundation and Connections	2
Feed Water Heater Foundation and Connections	1 Lot
Air Compressor Foundation and Connections	3
CT Water Injection Skid Foundation and Connections	2

<b>Equipment/System</b>	<b>Quantity (Plant)</b>
CT Static Starter Skid Foundation and Connections	2
CT Mechanical Accessory Compartment Foundation and Connections	2
Switchgear Equipment Foundation and Connections	1 Lot
CT Generator Step-up Transformer Foundation and Connections	2
ST Generator Step-up Transformer Foundation and Connections	1
HRSB Blowdown Tank Foundation and Connections	2
Fuel Gas Compressor Foundation and Connections	3
Fuel Gas Compressor Building	1
ST Lube Oil Package Foundation and Connections	1
Drain Cooler Foundation and Connections	1
Air Receiver Foundation and Connections	1
Air Dryer Foundation and Connections	1
Closed Cycle Cooling Water Heat Exchanger Foundation and Connections	2
Closed Cycle Cooling Water Pump Foundation and Connections	2
Ammonia Tank Foundation and Connections	2
Ammonia Injection Blower Foundation and Connections	1 Lot
Service Water Cooler Foundation and Connections	1 Lot
Electrical and Communications Building, Foundation, and Connections	1
Cooling Water Intake Structure	1 Lot
Cooling Water Discharge Lines and Diffuser	1 Lot
Cooling Water Intake/Discharge Tunnels	1 Lot
Oil/Water Separator Foundation and Connections	1
Demineralized Water Storage Tank, Foundation, and Connections	1
Closed Loop Cooling Water Tank, Foundation and Connections	1
Demolition Plan – Station A Turbine Hall	1
Demolition Plan – Station A Compressor Building	1
Demolition Plan – Station A Pump House	1
Demolition Plan – Station A Meter House	1
Demolition Plan – Station A Gate House	1
Demolition Plan – Shop Building	1
Potable Water Systems	1 Lot
Drainage Systems (including sanitary drain and waste)	1 Lot
Building Energy Conservation Systems	1 Lot
Temperature Control and Ventilation Systems (including water and sewer connections)	1 Lot

Equipment/System	Quantity (Plant)
High Pressure Piping	1 Lot
HVAC and Refrigeration Systems	1 Lot

**GEN-3** The project owner shall make payments to the CBO for design review, plan check and construction inspection based upon a reasonable fee schedule to be negotiated between the project owner and the CBO. These fees may be consistent with the fees listed in the 1998 CBC [Chapter 1, Section 107 and Table 1-A, Building Permit Fees; Appendix Chapter 33, Section 3310 and Table A-33-A, Grading Plan Review Fees; and Table A-33-B, Grading Permit Fees], adjusted for inflation and other appropriate adjustments; may be based on the value of the facilities reviewed; may be based on hourly rates; or may be as otherwise agreed by the project owner and the CBO.

**Verification:** The project owner shall make the required payments to the CBO in accordance with the agreement between the project owner and the CBO. The project owner shall send a copy of the CBO's receipt of payment to the CPM in the next Monthly Compliance Report indicating that the applicable fees have been paid.

**GEN-4** Prior to the start of rough grading, the project owner shall assign a California registered architect, structural engineer or civil engineer, as a resident engineer (RE), to be in general responsible charge of the project [Building Standards Administrative Code (Cal. Code Regs., tit. 24, § 4-209, Designation of Responsibilities).] All transmission facilities (lines, switchyards, switching stations, and substations) are handled in Conditions of Certification in the **Transmission System Engineering** section of this document.

The RE may delegate responsibility for portions of the project to other registered engineers. Registered mechanical and electrical engineers may be delegated responsibility for mechanical and electrical portions of the project respectively. A project may be divided into parts, provided each part is clearly defined as a distinct unit. Separate assignment of general responsible charge may be made for each designated part.

Protocol: The RE shall:

1. Monitor construction progress of work requiring CBO design review and inspection to ensure compliance with LORS;
2. Ensure that construction of all the facilities subject to CBO design review and inspection conforms in every material respect to the applicable LORS, these Conditions of Certification, approved plans, and specifications;
3. Prepare documents to initiate changes in the approved drawings and specifications when directed by the project owner or as required by conditions on the project;

4. Be responsible for providing the project inspectors and testing agency(ies) with complete and up-to-date set(s) of stamped drawings, plans, specifications and any other required documents;
5. Be responsible for the timely submittal of construction progress reports to the CBO from the project inspectors, the contractor, and other engineers who have been delegated responsibility for portions of the project; and
6. Be responsible for notifying the CBO of corrective action or the disposition of items noted on laboratory reports or other tests as not conforming to the approved plans and specifications.

The RE shall have the authority to halt construction and to require changes or remedial work, if the work does not conform to applicable requirements.

If the RE or the delegated engineers are reassigned or replaced, the project owner shall submit the name, qualifications and registration number of the newly assigned engineer to the CBO for review and approval. The project owner shall notify the CPM of the CBO's approval of the new engineer.

**Verification:** At least 30 days (or a lesser number of days mutually agreed to by the project owner and the CBO) prior to the start of rough grading, the project owner shall submit to the CBO for review and approval, the name, qualifications and registration number of the RE and any other delegated engineers assigned to the project. The project owner shall notify the CPM of the CBO's approvals of the RE and other delegated engineer(s) within five days of the approval.

If the RE or the delegated engineer(s) are subsequently reassigned or replaced, the project owner has five days in which to submit the name, qualifications, and registration number of the newly assigned engineer to the CBO for review and approval. The project owner shall notify the CPM of the CBO's approval of the new engineer within five days of the approval.

**GEN-5** Prior to the start of rough grading, the project owner shall assign at least one of each of the following California registered engineers to the project: A) a civil engineer; B) a geotechnical engineer or a civil engineer experienced and knowledgeable in the practice of soils engineering; C) a design engineer, who is either a structural engineer or a civil engineer fully competent and proficient in the design of power plant structures and equipment supports; D) a mechanical engineer; and E) an electrical engineer. [California Business and Professions Code section 6704 et seq., and sections 6730 and 6736 requires state registration to practice as a civil engineer or structural engineer in California.] All transmission facilities (lines, switchyards, switching stations, and substations) are handled in Conditions of Certification in the **Transmission System Engineering** section of this document.

The tasks performed by the civil, mechanical, electrical or design engineers may be divided between two or more engineers, as long as each engineer is responsible for a particular segment of the project (e.g., proposed earthwork, civil structures, power plant structures, equipment support). No segment of the

project shall have more than one responsible engineer. The transmission line may be the responsibility of a separate California registered electrical engineer.

Protocol: The project owner shall submit to the CBO for review and approval, the names, qualifications and registration numbers of all responsible engineers assigned to the project [1998 CBC, Section 104.2, Powers and Duties of Building Official].

If any one of the designated responsible engineers is subsequently reassigned or replaced, the project owner shall submit the name, qualifications and registration number of the newly assigned responsible engineer to the CBO for review and approval. The project owner shall notify the CPM of the CBO's approval of the new engineer.

Protocol: A: The civil engineer shall:

1. Design, or be responsible for design, stamp, and sign all plans, calculations, and specifications for proposed site work, civil works, and related facilities requiring design review and inspection by the CBO. At a minimum, these include: grading, site preparation, excavation, compaction, construction of secondary containment, foundations, erosion and sedimentation control structures, drainage facilities, underground utilities, culverts, site access roads, and sanitary sewer systems; and
2. Provide consultation to the RE during the construction phase of the project, and recommend changes in the design of the civil works facilities and changes in the construction procedures.

Protocol: B: The geotechnical engineer or civil engineer, experienced and knowledgeable in the practice of soils engineering, shall:

1. Review all the engineering geology reports, and prepare final soils grading report;
2. Prepare the soils engineering reports required by the 1998 CBC, Appendix Chapter 33, Section 3309.5 – Soils Engineering Report, and Section 3309.6 – Engineering Geology Report;
3. Be present, as required, during site grading and earthwork to provide consultation and monitor compliance with the requirements set forth in the 1998 CBC, Appendix Chapter 33, section 3317, Grading Inspections;
4. Recommend field changes to the civil engineer and RE;
5. Review the geotechnical report, field exploration report, laboratory tests, and engineering analyses detailing the nature and extent of the site soils that may be susceptible to liquefaction, rapid settlement or collapse when saturated under load; and

6. Prepare reports on foundation investigation to comply with the 1998 CBC, Chapter 18 section 1804, Foundation Investigations.

This engineer shall be authorized to halt earthwork and to require changes; if site conditions are unsafe or do not conform with predicted conditions used as a basis for design of earthwork or foundations [1998 CBC, section 104.2.4, Stop orders].

Protocol: C: The design engineer shall:

1. Be directly responsible for the design of the proposed structures and equipment supports;
2. Provide consultation to the RE during design and construction of the project;
3. Monitor construction progress to ensure compliance with LORS;
4. Evaluate and recommend necessary changes in design; and
5. Prepare and sign all major building plans, specifications and calculations.

Protocol: D: The mechanical engineer shall be responsible for, and sign and stamp a statement with, each mechanical submittal to the CBO, stating that the proposed final design plans, specifications, and calculations conform with all of the mechanical engineering design requirements set forth in the Energy Commission's Decision.

Protocol: E: The electrical engineer shall:

1. Be responsible for the electrical design of the project; and
2. Sign and stamp electrical design drawings, plans, specifications, and calculations.

**Verification:** At least 30 days (or a lesser number of days mutually agreed to by the project owner and the CBO) prior to the start of rough grading, the project owner shall submit to the CBO for review and approval, the names, qualifications and registration numbers of all the responsible engineers assigned to the project. The project owner shall notify the CPM of the CBO's approvals of the engineers within five days of the approval.

If the designated responsible engineer is subsequently reassigned or replaced, the project owner has five days in which to submit the name, qualifications, and registration number of the newly assigned engineer to the CBO for review and approval. The project owner shall notify the CPM of the CBO's approval of the new engineer within five days of the approval.

**GEN-6** Prior to the start of an activity requiring special inspection, the project owner shall assign to the project, qualified and certified special inspector(s) who

shall be responsible for the special inspections required by the 1998 CBC, Chapter 17, Section 1701, Special Inspections, Section, 1701.5 Type of Work (requiring special inspection), and Section 106.3.5, Inspection and observation program. All transmission facilities (lines, switchyards, switching stations, and substations) are handled in Conditions of Certification in the **Transmission System Engineering** section of this document.

Protocol: The special inspector shall:

1. Be a qualified person who shall demonstrate competence, to the satisfaction of the CBO, for inspection of the particular type of construction requiring special or continuous inspection;
2. Observe the work assigned for conformance with the approved design drawings and specifications;
3. Furnish inspection reports to the CBO and RE. All discrepancies shall be brought to the immediate attention of the RE for correction, then, if uncorrected, to the CBO and the CPM for corrective action; and
4. Submit a final signed report to the RE, CBO, and CPM, stating whether the work requiring special inspection was, to the best of the inspector's knowledge, in conformance with the approved plans and specifications and the applicable provisions of the applicable edition of the CBC.

A certified weld inspector, certified by the American Welding Society (AWS), and/or American Society of Mechanical Engineers (ASME) as applicable, shall inspect welding performed on-site requiring special inspection (including structural, piping, tanks and pressure vessels).

**Verification:** At least 15 days prior to the start of an activity requiring special inspection, the project owner shall submit to the CBO for review and approval, with a copy to the CPM, the name(s) and qualifications of the certified weld inspector(s), or other certified special inspector(s) assigned to the project to perform one or more of the duties set forth above. The project owner shall also submit to the CPM a copy of the CBO's approval of the qualifications of all special inspectors in the next Monthly Compliance Report.

If the special inspector is subsequently reassigned or replaced, the project owner has five days in which to submit the name and qualifications of the newly assigned special inspector to the CBO for approval. The project owner shall notify the CPM of the CBO's approval of the newly assigned inspector within five days of the approval.

**GEN-7** If any discrepancy in design and/or construction is discovered in any engineering work that has undergone CBO design review and approval, the project owner shall document the discrepancy and recommend the corrective action required [1998 CBC, Chapter 1, Section 108.4, Approval Required; Chapter 17, Section 1701.3, Duties and Responsibilities of the Special Inspector; Appendix Chapter 33, Section 3317.7, Notification of Noncompliance]. The discrepancy documentation shall be submitted to the CBO for review and



approval. The discrepancy documentation shall reference this Condition of Certification and, if appropriate, the applicable sections of the CBC and/or other LORS.

**Verification:** The project owner shall transmit a copy of the CBO's approval of any corrective action taken to resolve a discrepancy to the CPM in the next Monthly Compliance Report. If any corrective action is disapproved, the project owner shall advise the CPM, within five days, of the reason for disapproval, and the revised corrective action to obtain CBO's approval.

**GEN-8** The project owner shall obtain the CBO's final approval of all completed work that has undergone CBO design review and approval. The project owner shall request the CBO to inspect the completed structure and review the submitted documents. When the work and the "as-built" and "as graded" plans conform to the approved final plans, the project owner shall notify the CPM regarding the CBO's final approval. The marked up "as-built" drawings for the construction of structural and architectural work shall be submitted to the CBO. Changes approved by the CBO shall be identified on the "as-built" drawings [1998 CBC, Section 108, Inspections]. The project owner shall retain one set of approved engineering plans, specifications and calculations at the project site or at another accessible location during the operating life of the project [1998 CBC, Section 106.4.2, Retention of plans].

**Verification:** Within 15 days of the completion of any work, the project owner shall submit to the CBO, with a copy to the CPM in the next Monthly Compliance Report, (a) a written notice that the completed work is ready for final inspection, and (b) a signed statement that the work conforms to the final approved plans. After storing final approved engineering plans, specifications and calculations as described above, the project owner shall submit to the CPM a letter stating that the above documents have been stored and indicate the storage location of such documents.

**CIVIL-1** Prior to the start of site grading, the project owner shall submit to the CBO for review and approval the following:

1. Design of the proposed drainage structures and the grading plan;
2. An erosion and sedimentation control plan;
3. Related calculations and specifications, signed and stamped by the responsible civil engineer; and
4. Soils report as required by the 1998 CBC [Appendix Chapter 33, Section 3309.5, Soils Engineering Report and Section 3309.6, Engineering Geology Report].

**Verification:** At least 15 days prior to the start of site grading (or a lesser number of days mutually agreed to by the project owner and the CBO), the project owner shall submit the documents described above to the CBO for design review and approval. In the next Monthly Compliance Report following the CBO's approval, the project owner shall submit a written statement certifying that the documents have been approved by the CBO.

**CIVIL-2** The resident engineer shall, if appropriate, stop all earthworks and construction in the affected areas when the responsible geotechnical engineer or civil engineer experienced and knowledgeable in the practice of soils engineering identifies unforeseen adverse soil or geologic conditions. The project owner shall submit modified plans, specifications and calculations to the CBO based on these new conditions. The project owner shall obtain approval from the CBO before resuming earthwork and construction in the affected area [1998 CBC, Section 104.2.4, Stop orders].

**Verification:** The project owner shall notify the CPM, within five days, when earthwork and construction is stopped as a result of unforeseen adverse geologic/soil conditions. Within five days of the CBO's approval to resume earthwork and construction in the affected areas, the project owner shall provide to the CPM a copy of the CBO's approval.

**CIVIL-3** The project owner shall perform inspections in accordance with the 1998 CBC, Chapter 1, Section 108, Inspections; Chapter 17, Section 1701.6, Continuous and Periodic Special Inspection; and Appendix Chapter 33, Section 3317, Grading Inspection. All plant site grading operations for which a grading permit is required shall be subject to inspection by the CBO.

**Protocol:** If, in the course of inspection, it is discovered that the work is not being performed in accordance with the approved plans, the discrepancies shall be reported immediately to the resident engineer, the CBO, and the CPM. The project owner shall prepare a written report detailing all discrepancies and non-compliance items, and the proposed corrective action, and send copies to the CBO and the CPM.

**Verification:** Within five days of the discovery of any discrepancies, the resident engineer shall transmit to the CBO and the CPM a Non-Conformance Report (NCR), and the proposed corrective action. Within five days of resolution of the NCR, the project owner shall submit the details of the corrective action to the CBO and the CPM. A list of NCRs, for the reporting month, shall also be included in the following Monthly Compliance Report.

**CIVIL-4** After completion of finished grading and erosion and sedimentation control and drainage facilities, the project owner shall obtain the CBO's approval of the final "as-graded" grading plans, and final "as-built" plans for the erosion and sedimentation control facilities [1998 CBC, Section 109, Certificate of Occupancy].

**Verification:** Within 30 days of the completion of the erosion and sediment control mitigation and drainage facilities, the project owner shall submit to the CBO the responsible civil engineer's signed statement that the installation of the facilities and all erosion control measures were completed in accordance with the final approved combined grading plans, and that the facilities are adequate for their intended purposes. The project owner shall submit a copy of this report to the CPM in the next Monthly Compliance Report.

**STRUC-1** Prior to the start of any increment of construction of any major structure or component listed in **Table 1** of Condition of Certification **GEN-2**, above, the project owner shall submit to the CBO for design review and approval the

proposed lateral force procedures for project structures and the applicable designs, plans and drawings for project structures. Proposed lateral force procedures, designs, plans and drawings shall be those for the following items (from **Table 1**, above):

1. Major project structures;
2. Major foundations, equipment supports and anchorage;
3. Large field fabricated tanks;
4. Turbine/generator pedestal; and
5. Switchyard structures.

Construction of any structure or component shall not commence until the CBO has approved the lateral force procedures to be employed in designing that structure or component.

Protocol: The project owner shall:

1. Obtain approval from the CBO of lateral force procedures proposed for project structures;
2. Obtain approval from the CBO for the final design plans, specifications, calculations, soils reports, and applicable quality control procedures. If there are conflicting requirements, the more stringent shall govern (i.e., highest loads, or lowest allowable stresses shall govern). All plans, calculations, and specifications for foundations that support structures shall be filed concurrently with the structure plans, calculations, and specifications [1998 CBC, Section 108.4, Approval Required];
3. Submit to the CBO the required number of copies of the structural plans, specifications, calculations, and other required documents of the designated major structures at least 60 days (or a lesser number of days mutually agreed to by the project owner and the CBO) prior to the start of on-site fabrication and installation of each structure, equipment support, or foundation [1998 CBC, Section 106.4.2, Retention of plans and Section 106.3.2, Submittal documents]; and
4. Ensure that the final plans, calculations, and specifications clearly reflect the inclusion of approved criteria, assumptions, and methods used to develop the design. The final designs, plans, calculations and specifications shall be signed and stamped by the responsible design engineer [1998 CBC, Section 106.3.4, Architect or Engineer of Record].

**Verification:** At least 30 days (or a lesser number of days mutually agreed to by the project owner and the CBO) prior to the start of any increment of construction of any structure or component listed in **Table 1** of Condition of Certification **GEN-2**, above the project owner shall submit to the CBO, with a copy to the CPM, the responsible design

engineer's signed statement that the final design plans, specifications and calculations conform with all of the requirements set forth in the Energy Commission's Decision.

If the CBO discovers non-conformance with the stated requirements, the project owner shall resubmit the corrected plans to the CBO within 20 days of receipt of the nonconforming submittal with a copy of the transmittal letter to the CPM.

The project owner shall submit to the CPM a copy of a statement from the CBO that the proposed structural plans, specifications, and calculations have been approved and are in conformance with the requirements set forth in the applicable LORS.

**STRUC-2** The project owner shall submit to the CBO the required number of sets of the following documents related to work that has undergone CBO design review and approval:

1. Concrete cylinder strength test reports (including date of testing, date sample taken, design concrete strength, tested cylinder strength, age of test, type and size of sample, location and quantity of concrete placement from which sample was taken, and mix design designation and parameters);
2. Concrete pour sign-off sheets;
3. Bolt torque inspection reports (including location of test, date, bolt size, and recorded torques);
4. Field weld inspection reports (including type of weld, location of weld, inspection of non-destructive testing (NDT) procedure and results, welder qualifications, certifications, qualified procedure description or number (ref: AWS); and
5. Reports covering other structural activities requiring special inspections shall be in accordance with the 1998 CBC, Chapter 17, Section 1701, Special Inspections, Section 1701.5, Type of Work (requiring special inspection), Section 1702, Structural Observation and Section 1703, Nondestructive Testing.

**Verification:** If a discrepancy is discovered in any of the above data, the project owner shall, within five days, prepare and submit an NCR describing the nature of the discrepancies to the CBO, with a copy of the transmittal letter to the CPM. The NCR shall reference the Condition(s) of Certification and the applicable CBC chapter and section. Within five days of resolution of the NCR, the project owner shall submit a copy of the corrective action to the CBO and the CPM.

The project owner shall transmit a copy of the CBO's approval or disapproval of the corrective action to the CPM within 15 days. If disapproved, the project owner shall advise the CPM, within five days, the reason for disapproval, and the revised corrective action to obtain CBO's approval.

**STRUC-3** The project owner shall submit to the CBO design changes to the final plans required by the 1998 CBC, Chapter 1, Section 106.3.2, Submittal documents, and Section 106.3.3, Information on plans and specifications, including the revised drawings, specifications, calculations, and a complete description of, and supporting rationale for, the proposed changes, and shall give the CBO prior notice of the intended filing.

**Verification:** On a schedule suitable to the CBO, the project owner shall notify the CBO of the intended filing of design changes, and shall submit the required number of sets of revised drawings and the required number of copies of the other above-mentioned documents to the CBO, with a copy of the transmittal letter to the CPM. The project owner shall notify the CPM, via the Monthly Compliance Report, when the CBO has approved the revised plans.

**STRUC-4** Tanks and vessels containing quantities of toxic or hazardous materials exceeding amounts specified in Chapter 3, Table 3-E of the 1998 CBC shall, at a minimum, be designed to comply with Occupancy Category 2 of the 1998 CBC.

**Verification:** At least 30 days (or a lesser number of days mutually agreed to by the project owner and the CBO) prior to the start of installation of the tanks or vessels containing the above specified quantities of toxic or hazardous materials, the project owner shall submit to the CBO for design review and approval final design plans, specifications, and calculations, including a copy of the signed and stamped engineer's certification.

The project owner shall send copies of the CBO approvals of plan checks to the CPM in the following Monthly Compliance Report. The project owner shall also transmit a copy of the CBO's inspection approvals to the CPM in the Monthly Compliance Report following completion of any inspection.

**MECH-1** Prior to the start of any increment of major piping or plumbing construction, the project owner shall submit, for CBO design review and approval, the proposed final design, specifications and calculations for each plant major piping and plumbing system listed in **Table 1**, Condition of Certification **GEN-2**, above. Physical layout drawings and drawings not related to code compliance and life safety need not be submitted. The submittal shall also include the applicable QA/QC procedures. Upon completion of construction of any such major piping or plumbing system, the project owner shall request the CBO's inspection approval of said construction [1998 CBC, Section 106.3.2, Submittal Documents, Section 108.3, Inspection Requests, Section 108.4, Approval Required; 1998 California Plumbing Code, Section 103.5.4, Inspection Request, Section 301.1.1, Approval].

**Protocol:** The responsible mechanical engineer shall stamp and sign all plans, drawings and calculations for the major piping and plumbing systems subject to the CBO design review and approval, and submit a signed statement to the CBO when the said proposed piping and plumbing systems have been designed, fabricated and installed in accordance with all of the applicable laws, ordinances, regulations and industry standards [Section 106.3.4, Architect or Engineer of Record], which may include, but not be limited to:

- American National Standards Institute (ANSI) B31.1 (Power Piping Code);
- ANSI B31.2 (Fuel Gas Piping Code);
- ANSI B31.3 (Chemical Plant and Petroleum Refinery Piping Code);
- ANSI B31.8 (Gas Transmission and Distribution Piping Code);
- Title 24, California Code of Regulations, Part 5 (California Plumbing Code);
- Title 24, California Code of Regulations, Part 6 (California Energy Code, for building energy conservation systems and temperature control and ventilation systems);
- Title 24, California Code of Regulations, Part 2 (California Building Code); and
- Specific City/County code(s).

The CBO may deputize inspectors to carry out the functions of the code enforcement agency [1998 CBC, Section 104.2.2, Deputies].

**Verification:** At least 30 days (or a lesser number of days mutually agreed to by the project owner and the CBO) prior to the start of any increment of major piping or plumbing construction listed in **Table 1**, Condition of Certification **GEN-2** above, the project owner shall submit to the CBO for design review and approval the final plans, specifications and calculations, including a copy of the signed and stamped statement from the responsible mechanical engineer certifying compliance with the applicable LORS, and shall send the CPM a copy of the transmittal letter in the next Monthly Compliance Report.

The project owner shall transmit to the CPM, in the Monthly Compliance Report following completion of any inspection, a copy of the transmittal letter conveying the CBO's inspection approvals.

**MECH-2** For all pressure vessels installed in the plant, the project owner shall submit to the CBO and California Occupational Safety and Health Administration (Cal-OSHA), prior to operation, the code certification papers and other documents required by the applicable LORS. Upon completion of the installation of any pressure vessel, the project owner shall request the appropriate CBO and/or Cal-OSHA inspection of said installation [1998 CBC, Section 108.3 – Inspection Requests].

**Protocol:** The project owner shall:

1. Ensure that all boilers and fired and unfired pressure vessels are designed, fabricated and installed in accordance with the appropriate section of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, or other applicable code. Vendor certification, with identification of applicable code, shall be submitted for prefabricated vessels and tanks; and
2. Have the responsible design engineer submit a statement to the CBO that the proposed final design plans, specifications and calculations conform

to all of the requirements set forth in the appropriate ASME Boiler and Pressure Vessel Code or other applicable codes.

**Verification:** At least 30 days (or a lesser number of days mutually agreed to by the project owner and the CBO) prior to the start of on-site fabrication or installation of any pressure vessel, the project owner shall submit to the CBO for design review and approval, the above listed documents, including a copy of the signed and stamped engineer's certification, with a copy of the transmittal letter to the CPM.

The project owner shall transmit to the CPM, in the Monthly Compliance Report following completion of any inspection, a copy of the transmittal letter conveying the CBO's and/or Cal-OSHA inspection approvals.

**MECH-3** Prior to the start of construction of any heating, ventilating, air conditioning (HVAC) or refrigeration system, the project owner shall submit to the CBO for design review and approval the design plans, specifications, calculations and quality control procedures for that system. Packaged HVAC systems, where used, shall be identified with the appropriate manufacturer's data sheets.

**Protocol:** The project owner shall design and install all HVAC and refrigeration systems within buildings and related structures in accordance with the CBC and other applicable codes. Upon completion of any increment of construction, the project owner shall request the CBO's inspection and approval of said construction. The final plans, specifications and calculations shall include approved criteria, assumptions and methods used to develop the design. In addition, the responsible mechanical engineer shall sign and stamp all plans, drawings and calculations and submit a signed statement to the CBO that the proposed final design plans, specifications and calculations conform with the applicable LORS [1998 CBC, Section 108.7, Other Inspections; Section 106.3.4, Architect or Engineer of Record].

**Verification:** At least 30 days (or a lesser number of days mutually agreed to by the project owner and the CBO) prior to the start of construction of any HVAC or refrigeration system, the project owner shall submit to the CBO the required HVAC and refrigeration calculations, plans and specifications, including a copy of the signed and stamped statement from the responsible mechanical engineer certifying compliance with the CBC and other applicable codes, with a copy of the transmittal letter to the CPM.

**ELEC-1** Prior to the start of any increment of electrical construction for electrical equipment and systems 480 volts and higher, listed below, with the exception of underground duct work and any physical layout drawings and drawings not related to code compliance and life safety, the project owner shall submit, for CBO design review and approval, the proposed final design, specifications and calculations [CBC 1998, Section 106.3.2, Submittal documents]. Upon approval, the above listed plans, together with design changes and design change notices, shall remain on the site or at another accessible location for the operating life of the project. The project owner shall request that the CBO inspect the installation to ensure compliance with the requirements of applicable LORS [1998 CBC, Section 108.4, Approval Required, and Section 108.3, Inspection Requests]. All transmission facilities (lines, switchyards, switching stations, and substations) are

handled in Conditions of Certification in the **Transmission System Engineering** section of this document.

Protocol: A. Final plant design plans to include:

1. one-line diagrams for the 13.8 kV, 4.16 kV and 480 V systems; and
2. system grounding drawings.

Protocol: B. Final plant calculations to establish:

1. short-circuit ratings of plant equipment;
2. ampacity of feeder cables;
3. voltage drop in feeder cables;
4. system grounding requirements;
5. coordination study calculations for fuses, circuit breakers and protective relay settings for the 13.8 kV, 4.16 kV and 480 V systems;
6. system grounding requirements; and
7. lighting energy calculations.

Protocol: C. The following activities shall be reported to the CPM in the Monthly Compliance Report:

- receipt or delay of major electrical equipment;
- testing or energization of major electrical equipment; and
- a signed statement by the registered electrical engineer certifying that the proposed final design plans and specifications conform to requirements set forth in the Energy Commission Decision.

**Verification:** At least 30 days (or a lesser number of days mutually agreed to by the project owner and the CBO) prior to the start of each increment of electrical construction, the project owner shall submit to the CBO for design review and approval the above listed documents. The project owner shall include in this submittal a copy of the signed and stamped statement from the responsible electrical engineer attesting compliance with the applicable LORS, and shall send the CPM a copy of the transmittal letter in the next Monthly Compliance Report.

## REFERENCES

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SECAL (Southern Energy California). 2000a. Application for Certification, Potrero Power Plant Unit 7 Project (00-AFC-4). Submitted to the California Energy Commission, May 31.

SECAL (Southern Energy California). 2000b. Supplemental Information in Response to CEC Data Adequacy Request, Application for Certification, Potrero Power Plant Unit 7 Project (00-AFC-4). Submitted to the California Energy Commission, August 31.



# **GEOLOGY AND PALEONTOLOGY**

Testimony of Neal Mace

## **INTRODUCTION**

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The geology and paleontology section discusses Mirant's proposed Potrero Power Plant Unit 7 Project (Unit 7) and its potential impacts regarding geological hazards, geological and paleontological resources, and surface water hydrology. The purpose of this analysis is to verify that the applicable laws, ordinances, regulations, and standards (LORS) have been identified and that the project can be designed and constructed in accordance with all applicable LORS, and in a manner that protects environmental quality and assures public health and safety. Energy Commission staff's objective is to ensure that there will be no significant adverse impacts to significant geological and paleontological resources, and surface water hydrology during project construction, operation and closure. The section concludes with the staff's proposed monitoring and mitigation measures with respect to geological hazards, geological and paleontological resources, and surface water hydrology, with the inclusion of nine (9) Conditions of Certification.

## **LAWS, ORDINANCES, REGULATIONS AND STANDARDS**

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The applicable LORS are listed in the Application for Certification (AFC), in Sections 8.14, 8.15, and 8.16 (SECAL 2000a). A brief description of the LORS for paleontological resources, geological hazards and resources, and surface water hydrology follows:

### **FEDERAL**

There are no federal LORS for geological hazards and resources, or grading and erosion control. Unit 7 will not be located on lands owned by the United States Government.

### **STATE AND LOCAL**

The California Building Code (CBC) 1998 edition is based upon the Uniform Building Code (UBC), 1997 edition, which was published by the International Conference of Building Officials. The CBC is a series of standards that are used in investigation, design (Chapters 16 and 18) and construction (including grading and erosion control as found in Appendix Chapter 33). The CBC supplements the UBC's grading and construction ordinances and regulations.

The California Environmental Quality Act (CEQA) Guidelines, Appendix G, provides a checklist of questions that a lead agency should normally address if relevant to a project's environmental impacts.

- Section (V) (c) asks if the project will directly or indirectly destroy a unique paleontological resource or site or unique geological feature.

- Sections (VI) (a), (b), (c), (d), and (e) pose questions that are focused on whether or not the project would expose persons or structures to geological hazards.
- Sections (X) (a) and (b) pose questions about the project's effect on mineral resources

The Standard Procedures, Measures for Assessment and Mitigation of Adverse Impacts to Non-renewable Paleontologic Resources (SVP 1994) are a set of procedures and standards for assessing and mitigating impacts to vertebrate paleontological resources. They were adopted in October 1994 by a national organization of vertebrate paleontologists (the Society of Vertebrate Paleontologists).

## SETTING

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The Unit 7 proposal is a 540 megawatt natural gas-fired combined cycle generation facility located at the existing Potrero Power Plant (PPP) site. The proposed unit will utilize the existing natural gas supply line. In addition, the proposed project will include a new underground transmission connection to Pacific Gas and Electric's Hunters Point Substation and the demolition of the station "A" complex.

The PPP facility is located on Potrero Point along the west shore of San Francisco Bay. Potrero Point lies within the Hunters Point Shear Zone. The shear zone is part of the late Cretaceous to Early Tertiary Coast Range Thrust Fault that juxtaposed the Franciscan Formation and Great Valley Sequence. The California Division of Mines and Geology (1994) considers the shear zone inactive. Bedrock associated with the shear zone is not well exposed in the project area. Outcrops are limited to a serpentinite knob located approximately 0.2 miles to the north of the project site and Potrero Hill, to the west, where cataclasite and serpentinite are found at the ground surface or beneath a thin layer of artificial fill.

Potrero Point was originally a spur of Potrero Hill that rose to a height of over 100 feet. During the 19<sup>th</sup> Century the bay and tidelands immediately adjacent to Potrero Point were reclaimed, in part, with rock quarried from Potrero Point (Olmsted et. al., 1982). The project site spans the bedrock that originally formed Potrero Point and the tidelands reclaimed from the bay. The serpentinite bedrock varies in depth underneath the existing Potrero Power Plant site from a depth of generally less than five feet below grade in the northwest corner of the site, to up to eighty-five feet below grade immediately adjacent to the bay. In addition to this general trend of bedrock increasing in depth from west to east, the depth to bedrock increases to more than 50 feet below grade in the southwest corner of the site (Dames and Moore, 2000).

The entire site is mantled by artificial fill. Beneath the footprint of the proposed Unit 7, between 5 and 20 feet of fill overlie serpentinite bedrock, tidal flat deposits of bay mud and/or alluvium in the southwest corner of the site. The western half of the proposed water-pipeline alignment along the southern margin of the PPP site will be founded on bedrock, while the eastern half of the pipeline will overlie fill and bay mud deposits. The proposed cooling water intake structure will overlie fill and bay mud deposits along the margin of San Francisco Bay.

The transmission line will cross under Islais Creek. With the exception of the Islais Creek crossing the artificial fill covers the entire electrical transmission line alignment. The project site is paved. No indications of surface faulting were observed at the site during the site visit. In addition, no known active faults cross the Unit 7 footprint.

## **ANALYSIS AND IMPACTS**

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### **GEOLOGICAL HAZARDS**

#### **Faulting and Seismicity**

Energy Commission staff reviewed the California Division of Mines and Geology publication "Fault Activity Map of California and Adjacent Areas with Locations and Ages of Recent Volcanic Eruptions," dated 1994 (CDMG 1994). No active or potentially active faults are known to cross the power plant footprint. The project is located within seismic zone 4 as delineated on Figure 16-2 of the 1998 edition of the CBC. The closest known active fault is the San Andreas Fault, which is located 13.6 kilometers west of the project site. This fault is designated a class "A" fault under the CBC (a fault with a maximum magnitude earthquake greater than 7 and a slip rate in excess of 5 mm/year). The maximum magnitude earthquake for the segment of San Andreas Fault closest to the project is a moment magnitude 7.9 event. The slip rate for this section of the San Andreas Fault is 24 mm/year (ICBO 1998, Table 1).

In April 1906 the San Francisco Bay region experienced a moment magnitude 7.9 earthquake. Using the Abrahamson-Silva 1997 attenuation relationship, a moment magnitude 7.9 earthquake on the San Andreas fault whose epicenter is 13.6 kilometers west-southwest of the project site would produce an estimated peak horizontal bedrock acceleration for the power plant site of 0.65g. This value is generally consistent with the California Division of Mines and Geology (CDMG) Map Sheet 48, which predicts a peak ground acceleration with a 10 percent chance of exceedance in 50 years of between 0.5 and 0.6g for the project area. The Potrero Power Plant's Unit "A" occupied the site of the proposed facility, during the 1906 San Francisco earthquake. No significant damage to the station "A" complex occurred during the 1906 earthquake. The station "A" complex is no longer operated and for the most part had been torn down before the Loma Prieta earthquake in 1989. However, Unit three was in operation during the Loma Prieta earthquake. No significant damage to the existing power plant, including the fill pad, was reported after the Loma Prieta earthquake (Benuska, 1990, page 317). The project is located approximately 28 miles north of the epicenter of the Loma Prieta earthquake.

The potential of surface rupture on a fault at the power plant footprint is considered to be very low, since no active faults are known to have ruptured the ground surface of the project site. However, the potential for fault rupture can not be completely ruled out since the site is located within the Hunters Point shear zone.

## **Liquefaction, Hydrocompaction, and Expansive Soils**

### **Liquefaction**

Liquefaction is a condition in which a cohesionless soil loses its shear strength due to a sudden increase in pore water pressure. The CDMG's Seismic Hazard Map for the City and County of San Francisco (CDMG 2000) indicates that the eastern half and southwest corner of the PPP site is located in a liquefaction hazard zone. The distribution of potentially liquefiable soils depicted on the CDMG's map correlates to areas where the top of bedrock is below sea level. The soils most prone to liquefaction during earthquakes are fine-grained, poorly graded, saturated sands and silts.

The depth to groundwater at the proposed site generally varies from approximately 2 feet below existing grade to 14.5 feet below existing grade. In the northwest corner of the site no free ground water was encountered in an 80 foot deep boring that penetrated into the bedrock beneath the site. The combination of saturated soils of varying density and a potential for a moderately high peak horizontal ground acceleration points to a moderate potential for liquefaction at the site. The liquefaction potential of saturated bay mud deposits beneath the site is low due to the cohesion of the clay deposits. However, the loose granular artificial fill may have a moderate to high potential for liquefaction. This conclusion is supported by reported evidence of liquefaction in the vicinity of Islais Creek channel following the 1989 Loma Prieta Earthquake.

Due to the heterogeneous character of the fill, potentially liquefiable soils are expected to occur as zones or pockets, rather than as horizontally or vertically continuous layers. The potential for liquefaction induced lateral spreading within the fill is considered low because of the low surface gradients at the project site and the heterogeneous nature of the fill. Localized subsidence due to seismically induced densification of loose granular zones of fill is considered the most likely expression of liquefaction at the project site. Liquefaction of saturated zones of loose granular fill may also occur along the proposed transmission line alignment. Liquefaction is to be accounted for during the final design of the project's foundation.

### **Hydrocompaction**

Hydrocompaction is the process of the loss of soil volume upon the application of water. The soils at the site are dense enough and are relatively saturated so that hydrocompaction is not considered to be a significant problem.

### **Expansive soils**

Soils that contain a high percentage of expansive clay minerals are prone to expansion, if subjected to an increase in water content. Expansive soils are usually measured with an index test such as the expansive index potential. In order for a soil to be a candidate for testing, the soil must have a high clay content and the clay must have a high shrink-swell potential and a high plasticity index. The fill beneath the project site is expected to be primarily granular and near surface soils beneath the fill are typically saturated. As a result, the potential for damage to the project facilities from expansive soils is expected to be low.

## **Landslides**

Landsliding potential at the power plant site is considered to be low, since the project is located on a fill pad that has a slope of between 1 and 2 %, and there are no slopes adjacent to the site except at the edge of the San Francisco Bay. The electric transmission line route also has a low potential for slope failure because slope gradients along the alignment will typically be less than 5 percent.

## **GEOLOGICAL AND PALEONTOLOGICAL RESOURCES**

No geological resources have been identified at the power plant location, the natural gas supply line route, or the water supply line route. However, the northernmost one third of the power plant footprint is located in mineral resource zone (MRZ) MRZ-1 and the rest of the footprint is zoned MRZ-3 (CDMG 1987). The MRZ-1 designation means that there are no known mineralogical resources, while the MRZ-3 designation indicates that there are known mineralogical resources, but the existing available geologic data is not sufficient to assess the significance of the mineralogical resources. Mineralogical resources in the vicinity of the project include sand and gravel.

The proposed expansion site footprint is highly disturbed. During the construction of the original Potrero Power Plant, on-site soils were disturbed and used as fill throughout portions of the site. No significant paleontological resources were reported during the construction of the original Potrero Power Plant. Energy Commission staff has reviewed Appendix P "Paleontological Resources Assessment" of the applicant's report entitled "Potrero Power Plant Unit 7 Project" (SECAL, 2000b). The assessment includes notes from a field survey and archives search. The archives search did not indicate that any paleontologic resources were known to be located at the project site. A paleontological resources field survey was conducted at the project site and one mile west of the site on December 14, 1999. The western survey area was included due to notes made during the search of the paleontological archives. No significant paleontological resources were encountered during the field survey.

## **SURFACE WATER HYDROLOGY**

The project is proposed to have a base elevation of 25 feet above mean sea level (SECAL 2000a, figure 2-2). The estimated peak inundation elevation due to a combination of a 100-year high tide and a tsunami is 18.5 feet above mean sea level (SECAL 2000a, page 8.14-11). Minimum grade for the power plant area will be 1 percent and all drainage will be directed away from buildings within the footprint. The 100-year 24-hour storm event precipitation amount is 5.0 inches (NOAA 1973). Due to the demolition of existing structures and the construction of Potrero PP in an area already serviced by the existing surface water drainage system, the project should have no net effect on the quantity of surface water collected and discharged off-site.

## **SITE SPECIFIC IMPACTS**

Excavations, drilling, clearing and brushing operations, and grading of the fill and alluvium at the power plant site associated with construction of the project are considered to present a low potential impact to paleontological resources. At the time that this document was prepared, the site was not known to contain any fossils. The adoption and implementation of the proposed Conditions of Certification for

paleontological resources should mitigate any potential impacts to paleontological resources associated with the construction of this project.

The site overlies Mineral Resource Zones MZ-1 and MZ-3. These are areas of no known mineral resources and of potential mineral resources that have not been evaluated, respectively.

The discussion of the potential impacts with respect to water quality, including the impacts on turbidity and temperature, is deferred to the **Soils and Water Resources** section of this document. Storm water run-off is proposed to be managed through the proposed power plant's drainage control plan and by complying with the proposed Conditions of Certification for the **Soils and Water Resources** section of this document.

None of the geological and paleontological resources, identified by the applicant or by Energy Commission staff are considered to be significantly impacted by the construction and operation of the proposed project. In addition, the project is not likely to have any significant impact on surface water hydrology as well.

## **CUMULATIVE IMPACTS**

It is staff's opinion that the potential for significant adverse cumulative impacts on paleontological resources, geological resources, or surface water hydrology is unlikely, if Unit 7 is constructed according to the proposed Conditions of Certification. This opinion is based on the fact that the site is not known to have significant paleontological or geological resources.

## **FACILITY CLOSURE**

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A definition and general approach to closure is presented in the **General Conditions** section of this document. Facility closure activities are not anticipated to impact geological or paleontological resources. This is due to the fact that no significant paleontological or geological resources are known to exist at the power plant location. In addition, decommissioning and closure of the power plant should not negatively affect geological or paleontological resources since the majority of the ground disturbed in plant decommissioning and closure would have been disturbed in the construction of the plant. Surface water hydrology impacts will depend upon the closure activities proposed.

## **MITIGATION**

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Based upon the literature and archives search, field surveys and the preliminary geotechnical investigation for the project, the applicant has proposed monitoring and mitigation measures to be followed during the construction of the power plant, related natural gas supply line, electrical transmission line, and the waste water pipelines. Energy Commission staff agree with the applicant that there is a low probability that vertebrate fossils will be encountered during construction of the power plant and related features.

The proposed Conditions of Certification are to allow the Energy Commission Compliance Project Manager (CPM) and the applicant to adopt a compliance monitoring scheme that will ensure compliance with LORS applicable to geological hazards, geological and paleontological resources, and surface water hydrology for the project.

## **PUBLIC AND AGENCY COMMENTS ON THE PSA**

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No comments on Geology and Paleontology have been identified for the Unit 7 project.

## **CONCLUSION AND RECOMMENDATIONS**

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The applicant will likely be able to comply with applicable LORS. The project should have no adverse impact with respect to geological and paleontological resources and surface water hydrology. Staff proposes to ensure compliance with applicable LORS for geological hazards, geological and paleontological resources and surface water hydrology with the adoption of the proposed Conditions of Certification listed below, and the Conditions of Certification for surface water hydrology, which are located in the **Soils and Water Resources** section of this document.

## **PROPOSED CONDITIONS OF CERTIFICATION**

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**GEO-1** Prior to the start of construction, the project owner shall assign to the project an engineering geologist(s), certified by the State of California, to carry out the duties required by the 1998 edition of the California Building Code (CBC) Appendix Chapter 33, Section 3309.4. The certified engineering geologist(s) assigned must be approved by the Compliance Project Manager (CPM). A responsible geotechnical engineer may also perform the functions of the engineering geologist, if that person has the appropriate California license.

**Verification:** At least 30 days (or a lesser number of days mutually agreed to by the project owner and the Compliance Project Manager (CPM) prior to the start of construction, the project owner shall submit to the CPM, for approval, the name(s) and license number(s) of the certified engineering geologist(s) or geotechnical engineer(s) assigned to the project. The submittal should include a statement that CPM approval is needed. The CPM will approve or disapprove of the engineering geologist(s) or geotechnical engineer(s) and will notify the project owner of its findings within 15 days of receipt of the submittal. If the engineering geologist(s) or geotechnical engineer(s) are subsequently replaced, the project owner shall submit for approval the name(s) and license number(s) of the newly assigned individual(s) to the CPM. The CPM will notify the project owner of their approval or disapproval of the engineering geologist(s) or geotechnical engineer(s) within 15 days of receipt of the notice of personnel change.

**GEO-2** The assigned engineering geologist(s) or geotechnical engineer(s) shall carry out the duties required by the 1998 CBC, Appendix Chapter 33, Section 3309.4- Engineered Grading Requirement, and Section 3318.1 – Final Reports. Those duties are:

1. Prepare the Engineering Geology Report. This report shall accompany the Plans and Specifications when applying to the CBO for the grading permit.

2. Monitor geologic conditions during construction.
3. Prepare the Final Engineering Geology Report.

Protocol: The Engineering Geology Report required by the 1998 CBC Appendix Chapter 33, Section 3309.3 Grading Designation, shall include an adequate description of the geology of the site, conclusions and recommendations regarding the effect of geologic conditions, including the liquefaction potential and foundation conditions, on the proposed development, and an opinion on the adequacy of the site for the intended use as affected by geologic factors.

The Final Engineering Geology Report to be completed after completion of grading, as required by the 1998 CBC Appendix Chapter 33, Section 3318.1, shall contain the following: A final description of the geology of the site and any new information disclosed during grading; and the effect of same on recommendations incorporated in the approved grading plan. The engineering geologist shall also submit a statement that, to the best of his or her knowledge, the work within his or her area of responsibility is in accordance with the approved Engineering Geology Report and applicable provisions of this chapter.

**Verification:** (1) Within 15 days after submittal of the application(s) for grading permit(s) to the CBO, the project owner shall submit a signed statement to the CPM stating that the Engineering Geology Report has been submitted to the CBO as a supplement to the plans and specifications and that the recommendations contained in the report are incorporated into the plans and specifications. (2) Within 90 days following completion of the final grading, the project owner shall submit copies of the Final Engineering Geology Report required by the 1998 CBC Appendix Chapter 33, Section 3318- Completion of Work, to the CBO, and to the CPM on request.

**PAL-1** Prior to the start of any project-related construction activities (defined as any construction-related vegetation clearance, ground disturbance and preparation, and site excavation activities), the project owner shall ensure that the designated paleontological resource specialist approved by the CPM is available for field activities and prepared to implement the Conditions of Certification.

The designated paleontological resource specialist shall be responsible for implementing all the paleontological Conditions of Certification and for using qualified personnel to assist in this work.

Protocol: The project owner shall provide the CPM with the name and statement of qualifications for the designated paleontological resource specialist.

The statement of qualifications for the designated paleontological resources specialist shall demonstrate that the specialist meets the following minimum qualifications: a degree in paleontology or geology or paleontological resource management; and at least three years of paleontological resource mitigation and field experience in California, including at least one year's experience leading paleontological resource mitigation and field activities.



The statement of qualifications shall include a list of specific projects the specialist has previously worked on; the role and responsibilities of the specialist for each project listed; and the names and phone numbers of contacts familiar with the specialist's work on these referenced projects. If the CPM determines that the qualifications of the proposed paleontological resource specialist do not satisfy the above requirements, the project owner shall submit another individual's name and qualifications for consideration.

If the approved, designated paleontological resource specialist is replaced prior to completion of project mitigation, the project owner shall obtain CPM approval of the new designated paleontological resource specialist by submitting the name and qualifications of the proposed replacement to the CPM, at least ten (10) days prior to the termination or release of the preceding designated paleontological resource specialist.

Should emergency replacement of the designated specialist become necessary, the project owner shall immediately notify the CPM to discuss the qualifications of its proposed replacement specialist.

**Verification:** At least ninety (90) days prior to the start of construction, the project owner shall submit the name and resume and the availability for its designated paleontological resource specialist, to the CPM for review and approval. The CPM shall provide written approval or disapproval of the proposed paleontological resource specialist.

At least ten (10) days prior to the termination or release of a designated paleontological resource specialist, the project owner shall obtain CPM approval of the replacement specialist by submitting to the CPM the name and resume of the proposed new designated paleontological resource specialist. Should emergency replacement of the designated specialist become necessary, the project owner shall immediately notify the CPM to discuss the qualifications of its proposed replacement specialist.

**PAL-2** Prior to the start of project construction, the designated paleontological resource specialist shall prepare a Paleontological Resources Monitoring and Mitigation Plan to identify general and specific measures to minimize potential impacts to sensitive paleontological resources, and submit this plan to the CPM for review and approval. After CPM approval, the project owner's designated paleontological resource specialist shall be available to implement the Monitoring and Mitigation Plan, as needed, throughout project construction.

In addition to the project owner's adoption of the guidelines of the Society of Vertebrate Paleontologists (SVP 1994), the Paleontological Resources Monitoring and Mitigation Plan shall include, but not be limited to, the following elements and measures:

- A discussion of the sequence of project-related tasks, such as any pre-construction surveys, fieldwork, flagging or staking; construction monitoring;

mapping and data recovery; fossil preparation and recovery; identification and inventory; preparation of final reports; and transmittal of materials for curation;

- Identification of the person(s) expected to assist with each of the tasks identified within this condition for certification, and a discussion of the mitigation team leadership and organizational structure, and the inter-relationship of tasks and responsibilities;
- Where monitoring of project construction activities is deemed necessary, the extent of the areas where monitoring is to occur and a schedule for the monitoring;
- An explanation that the designated paleontological resource specialist shall have the authority to halt or redirect construction in the immediate vicinity of a vertebrate fossil find until the significance of the find can be determined;
- A discussion of equipment and supplies necessary for recovery of fossil materials and any specialized equipment needed to prepare, remove, load, transport, and analyze large-sized fossils or extensive fossil deposits;
- Inventory, preparation, and delivery for curation into a retrievable storage collection in a public repository or museum, which meets the Society of Vertebrate Paleontologists standards and requirements for the curation of paleontological resources; and
- Identification of the institution that has agreed to receive any data and fossil materials recovered during project-related monitoring and mitigation work, discussion of any requirements or specifications for materials delivered for curation and how they will be met, and the name and phone number of the contact person at the institution.

**Verification:** At least sixty (60) days prior to the start of construction on the project, the project owner shall provide the CPM with a copy of the Monitoring and Mitigation Plan prepared by the designated paleontological resource specialist for review and approval. If the plan is not approved, the project owner, the designated paleontological resource specialist, and the CPM shall meet to discuss comments and negotiate necessary changes.

**PAL-3** Prior to the start of construction, and throughout the project construction period as needed for all new employees, the project owner and the designated paleontological resource specialist shall prepare and conduct CPM-approved training to all project managers, construction supervisors, and workers who operate ground disturbing equipment. The project owner and construction manager shall provide the workers with the CPM-approved set of procedures for reporting any sensitive paleontological resources or deposits that may be discovered during project-related ground disturbance.

**Protocol:** The paleontological training program shall discuss the potential to encounter paleontological resources in the field, the sensitivity and importance of these resources, and the legal obligations to preserve and protect such resources.

The training shall also include the set of reporting procedures that workers are to follow if paleontological resources are encountered during project activities. The training program shall be presented by the designated paleontological resource specialist and may be combined with other training programs prepared for cultural and biological resources, hazardous materials, or any other areas of interest or concern.

**Verification:** At least (30) thirty days prior to the start of project construction, the project owner shall submit to the CPM for review, comment, and written approval, the proposed employee training program and the set of reporting procedures the workers are to follow if paleontological resources are encountered during project construction.

If the employee training program and set of procedures are not approved, the project owner, the designated paleontological resource specialist, and the CPM shall meet to discuss comments and negotiate necessary changes, before the beginning of construction.

Documentation for training of additional new employees shall be provided in subsequent Monthly Compliance Reports, as appropriate.

**PAL-4** The designated paleontological resource specialist or designee shall be present at all times he or she deems appropriate to monitor construction-related grading, excavation, trenching, and/or augering in areas where potentially fossil-bearing sediments have been identified. If the designated paleontological resource specialist determines that full-time monitoring is not necessary in certain portions of the project area or along portions of the linear facility routes, the designated specialist shall notify the project owner.

**Verification:** The project owner shall include in the Monthly Compliance Reports a summary of paleontological activities conducted by the designated paleontological resource specialist.

**PAL-5** The project owner, through the designated paleontological resource specialist, shall ensure recovery, preparation for analysis, analysis, identification and inventory, the preparation for curation, and the delivery for curation of all significant paleontological resource materials encountered and collected during the monitoring, data recovery, mapping, and mitigation activities related to the project.

**Verification:** The project owner shall maintain in its compliance files copies of signed contracts or agreements with the designated paleontological resource specialist and other qualified research specialists who will ensure the necessary data and fossil recovery, mapping, preparation for analysis, analysis, identification and inventory, and preparation for and delivery of all significant paleontological resource materials collected during data recovery and mitigation for the project. The project owner shall maintain these files for a period of three years after completion and approval of the CPM-approved Paleontological Resources Report and shall keep these files available for periodic audit by the CPM.

**PAL-6** The project owner shall ensure preparation of a Paleontological Resources Report by the designated paleontological resource specialist. The Paleontological

Resources Report shall be completed following completion of the analysis of the recovered fossil materials and related information. The project owner shall submit the paleontological report to the CPM for approval.

Protocol: The report shall include, but not be limited to, a description and inventory list of recovered fossil materials; a map showing the location of paleontological resources encountered; determinations of sensitivity and significance; and a statement by the paleontological resource specialist that project impacts to paleontological resources have been mitigated.

**Verification:** The project owner shall submit a copy of the Paleontological Resources Report to the CPM for review and approval under a cover letter stating that it is a confidential document. The report is to be prepared by the designated paleontological resource specialist within 90 days following completion of the analysis of the recovered fossil materials.

**PAL-7** The project owner shall include in the facility closure plan a description regarding the facility closure activity's potential to impact paleontological resources. The conditions for closure will be determined when a facility closure plan is submitted to the CPM twelve months prior to closure of the facility. If no activities are proposed that would potentially impact paleontological resources, then no mitigation measures for paleontological resource management are required in the facility closure plan.

Protocol: The closure requirements for paleontological resources are to be based upon the Paleontological Resources Report and the proposed grading activities for facility closure.

**Verification:** The project owner shall include a description of closure activities described above in the facility closure plan.

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# POWER PLANT EFFICIENCY

Testimony of James C. Henneforth

## INTRODUCTION

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The Energy Commission makes findings as to whether energy use by the Potrero Power Plant Unit 7 Project (Unit 7) will result in significant adverse impacts on the environment, as defined in the California Environmental Quality Act (CEQA). If the Energy Commission finds that the consumption of energy creates a significant adverse impact, it must determine whether there are any feasible mitigation measures that could eliminate or minimize the impacts. In this analysis staff addresses the issue of inefficient and unnecessary consumption of energy.

In order to support the Energy Commission's findings, this analysis will:

- determine whether the facility will likely present any adverse impacts upon energy resources;
- determine whether these adverse impacts are significant; and if so,
- determine whether feasible mitigation measures exist that would eliminate the adverse impacts, or reduce them to a level of insignificance.

## LAWS, ORDINANCES, REGULATIONS AND STANDARDS

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### FEDERAL

No federal laws apply to the efficiency of this project.

### STATE

#### **California Environmental Quality Act Guidelines**

CEQA Guidelines state that the environmental analysis "...shall describe feasible measures which could minimize significant adverse impacts, including where relevant, inefficient and unnecessary consumption of energy" (Cal. Code Regs., tit. 14, § 15126.4(a)(1)). Appendix F of the Guidelines further suggests consideration of such factors as the project's energy requirements and energy use efficiency; its effects on local and regional energy supplies and energy resources; its requirements for additional energy supply capacity; its compliance with existing energy standards; and any alternatives that could reduce wasteful, inefficient and unnecessary consumption of energy (Cal. Code regs., tit. 14, § 15000 et seq., Appendix F).

### LOCAL

No local or county ordinances apply to power plant efficiency.

## SETTING

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Mirant proposes to construct and operate a (nominal) 540 MW base load combined cycle merchant power plant to generate and sell electric energy and capacity into the deregulated electricity marketplace (SECAL 2000a, AFC § 1.1). Unit 7 will consist of two GE Frame FA combustion turbines in a two-on-one combined cycle configuration with one steam turbine. Each heavy-duty combustion turbine generator (CTG) is nominally rated at 175 MW, at 59°F and 60% relative humidity ambient conditions. Each CTG will exhaust into a supplementary fired, natural circulation, reheat type heat recovery steam generator (HRSG) with three pressure levels. Steam from both of the HRSGs will be admitted into a single condensing reheat steam turbine that will nominally generate 200 MW of electrical power. The total net output of the combined cycle, with CTG evaporative inlet air cooling, will be approximately 540 MW. The CTGs will be equipped with dry low-NOx combustors, and the HRSGs will be designed with Selective Catalytic Reduction (SCR) to reduce the emissions of NOx. Each HRSG will also include an oxidation CO catalyst system designed to reduce the carbon monoxide produced in firing natural gas in the CTG and in the duct burner (SECAL 2000a, AFC §§ 1.4, 2.2.3.1, 2.2.3.2, 2.2.3.3, 2.2.10).

## ANALYSIS

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### ADVERSE IMPACTS ON ENERGY RESOURCES

The inefficient and unnecessary consumption of energy, in the form of non-renewable fuels such as natural gas and oil, constitutes an adverse environmental impact. An adverse impact can be considered significant if it results in:

- adverse effects on local and regional energy supplies and energy resources;
- a requirement for additional energy supply capacity;
- noncompliance with existing energy standards; or
- the wasteful, inefficient and unnecessary consumption of fuel or energy.

### Project Energy Requirements and Energy Use Efficiency

Any power plant large enough to fall under Energy Commission siting jurisdiction will consume large amounts of energy. Unit 7 will burn natural gas at an approximate rate of 86.4 billion Btu per day at normal full load. This is a substantial rate of energy consumption, and holds the potential to impact energy supplies. Unit 7 in the combined cycle configuration will achieve an efficiency of approximately 56% LHV (Lower Heating Value). This may be compared to the average fuel efficiency of a typical utility company base load conventional steam power plant at approximately 35 percent LHV.

### Adverse Effects on Energy Supplies Resources

The applicant has described its sources of supply of natural gas for the proposed Unit 7 (SECAL 2000a, AFC §§ 2.2.5, 2.4.4). The project will burn natural gas from the existing Pacific Gas and Electric (PG&E) pipeline located at the site. The gas supply infrastructure is extensive, offering access to vast reserves of gas from the Rocky Mountains, Canada and the Southwest. This source represents far more gas than



would be required for a project this size. Energy Commission predictions are that natural gas supplies will be adequate for many years into the future. It is therefore highly unlikely that Unit 7 could pose an increase in demand for natural gas that would adversely affect supplies to California. There is no real likelihood that Unit 7 will require the development of additional energy supply capacity.

### **Additional Energy Supply Requirements**

The supply of natural gas fuel to the project will be from the resource and delivery systems serving gas to California from the east using fields in the southwest, Rocky Mountains, and Canada. While there are seasonal variations that affect pricing, the reserves consist of vast resources and the pipeline systems delivering the gas are well established and sufficiently sized to meet the requirements of the Northern California area, including the needs of Unit 7. There appears no real likelihood that Unit 7 will require the development of new sources of energy.

### **Compliance with Energy Standards**

No standards apply to the efficiency of Unit 7 or other non-cogeneration projects.

### **Alternatives to Reduce Wasteful, Inefficient and Unnecessary Energy Consumption**

Unit 7 could be deemed to create significant adverse impacts on energy resources if alternative designs existed that would reduce the project's use of fuel. Evaluation of alternatives to the project that could reduce wasteful, inefficient or unnecessary energy consumption first requires examination of the project's energy consumption. Project fuel efficiency, and therefore its rate of energy consumption, is determined by the configuration of the power producing system and by the selection of equipment used to generate power.

### **Project Configuration**

Unit 7 will be configured as a combined cycle power plant, in which electricity is generated by two gas turbines, and additionally by one reheat steam turbine that operates on heat energy recuperated from the gas turbines' exhaust (SECAL 2000a, AFC §§ 1.4, 2.2.3.2). By recovering this heat, which would otherwise be lost up the exhaust stacks, the efficiency of any combined cycle power plant is increased considerably from that of either gas turbines or steam turbines operating alone. Such a configuration is well suited to the large, steady loads met by a base load plant, which are intended to supply energy efficiently for long periods of time.

The number of turbines further contributes to efficiency at part load. Gas turbine generators operate most efficiently at one particular output level, typically at full load. Whenever desired output is less than full load, the unit must be throttled back. Rather than being forced to throttle back both large turbines, with the consequent reduction in efficiency, the power plant operator will have the option of shutting off one of the gas turbines. This allows the plant to generate at half load while maintaining maximum efficiency, suitable for a plant meant for flexible generation, such as load-following and peaking duty.

## **Equipment Selection**

Modern gas turbines in combined cycle mode embody the most fuel-efficient electric generating technology available today. The heavy-duty GE Frame FA gas turbines, to be employed in Unit 7, represent some of the most modern and efficient machines now available. The applicant will employ a two-on-one GE combined cycle power train (SECAL, 2000a, AFC §§ 1.4, 2.2.2). The two-on-one configuration (two CTGs and one steam turbine) design is nominally rated at 540 MW and approximately 56 percent efficiency LHV at ISO conditions (defined as International Standards Organization standard conditions of 59°F, 60% relative humidity, and sea level elevation). Possible alternative combustion turbines are the ABB K24 and the Siemens-Westinghouse 501F. These machines are functionally equivalent and considered to be an equivalent class of machines to the GE Frame FA with efficiencies and outputs within a few percentage points. Therefore, any differences among the three in actual operating efficiency will be considered insignificant. Therefore, selection among these machines is thus based on other factors such as market price and equipment availability.

## **Efficiency of Alternatives to the Project**

The project objectives are to maintain the quality and reliability of San Francisco's electrical energy supply, to sell the output into California's restructured electricity market, and to design and construct the plant to operate continuously throughout the year (with allowances for maintenance). Further project objectives include minimizing capital costs, minimizing or avoiding environmental impacts, and maximizing utilization of existing Potrero Power Plant systems (SECAL 2000a, AFC §§ 1.1, 1.7).

## **Alternative Generating Technologies**

The applicant addresses alternative generating technologies in its application (SECAL 2000a, AFC § 1.7). Other fossil fuel burning power generating facilities such as oil and coal would be less efficient and produce greater emissions than the proposed design for Unit 7. Given the project objectives, location, and air pollution control requirements, staff agrees with the applicant that from the standpoint of efficiency only natural gas-burning technologies are feasible.

## **Natural Gas-Burning Technologies**

Fuel consumption is one of the most important economic factors in selecting an electric generator; fuel typically accounts for over two-thirds of the total operating costs of a fossil-fired power plant. Under a competitive power market system, where operating costs are critical in determining the competitiveness and profitability of a power plant, the plant owner is thus strongly motivated to purchase fuel efficient machinery. Capital cost is also important in selecting generating machinery. Recent progress in the development of large, stationary gas turbines, aided by the incorporation into these machines of technological advances made in the development of aircraft (jet) engines, has created a situation in which several large manufacturers compete vigorously to sell their machines. This, combined with the cost advantages of assembly-line manufacturing, has driven down the prices of these machines. Thus, the power plant developers can purchase a turbine generator that not only offers the lowest available fuel costs, but at the same time sells for the lowest per-kilowatt capital cost.

Possible alternatives to the GE Frame FA combustion turbine are the Siemens-Westinghouse 501G gas turbine generator and the GE Frame 7H gas turbine generator. Both machines are relatively new with limited applications and therefore the applicant's decision to use the GE Frame FA is considered to be reasonable.

A further choice of alternatives involves the selection of gas turbine inlet air cooling methods. The two commonly used techniques are the evaporative cooler and the refrigeration chiller; both devices increase power output by cooling the gas turbine inlet air. A mechanical chiller can offer greater power output than the evaporative cooler on hot, humid days, but consumes electric power to operate its refrigeration process, thus slightly reducing overall net power output and, thus, overall efficiency. An absorption chiller uses less electric power, but necessitates the use of a substantial inventory of ammonia. An evaporative cooler boosts power output best on dry days; it uses less electric power than a mechanical chiller, possibly yielding slightly higher operating efficiency. The evaporative cooler inlet system does require additional water that must be made up due to evaporation loss and blowdown to maintain water quality. The difference in efficiency among these techniques is relatively insignificant. The applicant proposes to employ evaporative cooling (SECAL 2000a, AFC § 2.2.3.1). Given the climate at the project site and the relative lack of clear superiority of one system over the other, staff agrees that the applicant's approach will yield no significant adverse energy impacts.

In conclusion, the project configuration (two-on-one configuration combined cycle) and generating equipment (F-class gas turbines) with inlet air evaporative cooling, appears to represent the most efficient feasible combination to satisfy the project objectives. There are no alternatives that could significantly reduce energy consumption.

## **CUMULATIVE IMPACTS**

While there are seasonal variations with the supply, delivery, and pricing of natural gas that may affect the regional area of Unit 7, this plant incrementally is not sufficient to be a cause of concern for these issues. When considering other power plant projects located in the San Francisco area, the potential for cumulative energy consumption impacts when aggregated with Unit 7 are not expected to be significant. Staff knows of no other new projects that could result in cumulative energy impacts. Unit 7 will have a higher efficiency than existing plants in the area and, based on its capability to produce more power using less fuel, staff believes that construction and operation of Unit 7 will not bring about indirect impacts, in the form of additional fuel consumption, that would not have occurred but for Unit 7. California's electric power will be generated by those power plants that bid most successfully to sell their output to the market. Unit 7 will be one of the most fuel efficient power plants in the San Francisco area and even in the US. Since no significantly more efficient power plants are envisioned to compete against Unit 7, no indirect impacts are likely.

## **FACILITY CLOSURE**

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Future closure of the facility, whether planned or unplanned, will not influence, nor will it be influenced by, project efficiency. Any efficiency impacts due to closure of the project would be on the electric system as a whole. Yet the vast size of the electric system

serving California, the number of generating plants offering to sell power into it, the planned future expansions of generating facilities, and the existence of the California Independent System Operator should ensure the efficient management of the system. With proper planning and management of the electric system, the future closure of this facility should not produce significant adverse impacts on efficiency.

## **RESPONSE TO PUBLIC AND AGENCY COMMENTS ON THE PSA**

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No comments were received on the efficiency section of the Preliminary Staff Assessment.

## **CONCLUSIONS AND RECOMMENDATIONS**

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Unit 7, if constructed and operated as proposed, would generate 540 MW of electric power at an overall project fuel efficiency of approximately 56 percent. While it will consume substantial amounts of energy, it will do so in the most efficient manner practicable. It will not create significant adverse effects on energy supplies or resources, will not require additional sources of energy supply, and will not consume energy in a wasteful or inefficient manner. No energy standards apply to the project. Staff therefore concludes that Unit 7 would present no significant adverse impacts upon energy resources.

No cumulative impacts on energy resources are likely. Facility closure would not likely present significant impacts on electric system efficiency. No Conditions of Certification are proposed.

## **REFERENCES**

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SECAL (Southern Energy California). 2000a. Application for Certification, Potrero Power Plant Unit 7 Project (00-AFC-4). Submitted to the California Energy Commission, May 31, 2000.

# **POWER PLANT RELIABILITY**

Testimony of James C. Henneforth

## **INTRODUCTION**

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In this analysis, Energy Commission staff addresses the reliability issues of the project to determine if the proposed power plant is likely to be built in accordance with typical industry norms for reliability of power generation. Staff uses this level of reliability as a benchmark because the resulting project would likely not degrade the overall reliability of the electric system it serves (see Setting below).

The scope of this power plant reliability analysis covers:

- equipment availability;
- plant maintainability;
- fuel and water availability; and
- power plant reliability in relation to natural hazards.

Staff examined the project design criteria to determine if the project is likely to be built in accordance with typical industry norms for reliability of power generation. While Mirant Potrero, LLC (Mirant), who would be the owner of the Potrero Power Plant Unit 7 Project (Unit 7), has predicted a level of reliability for the power plant (see below), staff believes Mirant should not be held responsible for achieving this goal, so long as the plant's reliability matches or exceeds that of similar plants.

## **LAWS, ORDINANCES, REGULATIONS AND STANDARDS (LORS)**

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Presently, there are no laws, ordinances, regulations or standards (LORS) that establish either power plant reliability criteria or procedures for attaining reliable operation. However, the commission must make findings as to the manner in which the project is to be designed, sited and operated to ensure safe and reliable operation (Cal. Code Regs., tit. 20, § 1752(c)). Staff takes the approach that a project is acceptable if it does not degrade the reliability of the utility system to which it is connected. This is likely the case if the project exhibits reliability at least equal to that of other power plants on that system (see Setting below).

## **SETTING**

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In the regulated monopoly electric industry of past decades, the utility companies assured overall system reliability, in part, by maintaining a "reserve margin." This amounted to having on call, at all times, sufficient generating capacity, in the form of standby power plants, to quickly handle unexpected outages of generating or transmission facilities. The utilities generally maintained a seven to ten percent reserve margin, meaning that sufficient capacity was on call to quickly replace from seven to ten percent of total system resources. This margin proved adequate, in part because of the reliability of the power plants that constituted the system.

Now, in the newly restructured competitive electric power industry, the responsibility for maintaining system reliability falls largely to the California Independent System Operator (Cal-ISO), an entity that purchases, dispatches and sells electric power throughout the state. How Cal-ISO will ensure system reliability is still being determined; protocols are being developed and put in place that will, it is anticipated, allow sufficient reliability to be maintained under the competitive market system. "Must-run" power purchase agreements and "participating generator" agreements are two mechanisms being employed to ensure an adequate supply of reliable power (Mavis 1998, pers. comm.). As a result of power shortages in California during summer of 2000 and winter of 2001, changes are being made by the Governor and the state legislature to increase and ensure the overall reliability of power generating and distribution systems.

The Cal-ISO also requires those power plants selling ancillary services, as well as those holding reliability must-run contracts, to fulfill certain requirements, including:

- filing periodic reports on plant reliability;
- reporting all outages and their causes; and
- scheduling all planned maintenance outages with the Cal-ISO (Detmers 1999, pers. comm.).

The Cal-ISO's mechanisms to ensure adequate power plant reliability apparently have been devised under the assumption that the individual power plants that compete to sell power into the system will each exhibit a level of reliability similar to that of power plants of past decades. However, there is cause to believe that, under free market competition, financial pressures on power plant owners to minimize capital outlays and maintenance expenditures may act to reduce the reliability of many power plants, both existing and newly constructed. It is possible that, if significant numbers of power plants exhibit individual reliability sufficiently lower than this historical level, the assumptions used by Cal-ISO to ensure system reliability will prove invalid, with potentially disappointing results. Until the restructured competitive electric power system has undergone a shakeout period, and the effects of varying power plant reliability are understood and compensated for, staff deems it wise to encourage power plant owners to continue to build and operate their projects to the level of reliability to which all in the industry are accustomed.

Mirant proposes to operate the 540 MW Unit 7 at base load, selling energy and capacity on the market and via direct bilateral contracts. The plant is expected to achieve an annual average capacity factor of between 75 and 85 percent (SECAL 2000a, AFC §§ 1.1, 1.4). The projected annual availability for the facility is between 92 and 95 percent.

## **ANALYSIS**

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A reliable power plant is one that is available when called upon to operate. Throughout its intended life, Unit 7 will be expected to perform reliably in base load and load following mode. Power plant systems must be able to operate for extended periods (sometimes months on end) without shutting down for maintenance or repairs. Achieving this reliability is accomplished by ensuring adequate levels of equipment availability, plant maintainability, fuel and water availability, and resistance to natural

hazards. Staff examines these factors for the project and compares them to industry norms. If they compare favorably, staff can conclude that Unit 7 will be as reliable as other power plants on the electric system, and will therefore not degrade system reliability.

## **EQUIPMENT AVAILABILITY**

Equipment availability will be ensured by use of appropriate quality assurance/ quality control (QA/QC) programs during design, procurement, construction and operation of the plant, and by providing for adequate maintenance and repair of the equipment and systems (discussed below). The project will maintain a record of documents for review and reference including vendor instruction manuals; design calculations and drawings; quality assurance reports; inspection and equipment testing reports; conformed construction drawings and records; and procurement specifications, purchase orders and project correspondence. During construction the quality assurance program will include inspections of equipment/components, installations, system and component testing, and startup and commissioning (SECAL 2000a, AFC § 2.4.6).

The applicant has identified equipment to be purchased from qualified suppliers, based on technical and commercial evaluations. The applicant has described a quality control program to yield typical reliability of design and construction. To ensure such implementation, staff will propose appropriate conditions of certification under the portion of this document entitled **Facility Design**.

## **PLANT MAINTAINABILITY**

### **Equipment Redundancy**

A generating facility called on to operate in base load service for long periods of time must be capable of being maintained while operating. A typical approach for achieving this is to provide redundant examples of those pieces of equipment most likely to require service or repair. Mirant plans to provide appropriate redundancy of function for the combined cycle portion of the project (SECAL 2000a, AFC § 2.4.3). The fact that the project consists of two trains of gas turbine generators and heat recovery steam generators (HRSG) that supply steam to the steam turbine provide inherent reliability. Failure of a non-redundant component of one train should not cause the other train to fail, thus allowing the plant to continue to generate (though at reduced output). Further, the plant's distributed control system (DCS) will be built with typical redundancy. Other balance of plant equipment will be provided with redundant examples, thus:

- two 50 percent boiler feed pumps per train;
- two 100 percent condensate pumps;
- two 50 percent circulating water pumps;
- separate main transformers for each CTG and STG;
- three 100 percent air compressors;
- three 50 percent fuel gas compressors.

Additionally, there will be a steam bypass system that will allow for the gas turbines to operate at full load in the event of a steam turbine outage (SECAL 2000a, AFC Table 2-19). With this opportunity for continued operation in the face of equipment failure, staff believes that equipment redundancy will be sufficient for a project such as this.

### **Maintenance Program**

Mirant proposes to establish a plant maintenance program typical of the industry (SECAL 2000a, AFC §2.4.1). Equipment manufacturers provide maintenance recommendations with their products; the applicant will base its maintenance program on these recommendations. For example, each gas turbine will be scheduled for a week to 10 days per year off-line (at times of low electricity demand) in order to perform annual inspections and cleaning. Every third year, each gas turbine will undergo a hot gas path inspection lasting up to three weeks. Every sixth year, each gas turbine will undergo a major maintenance turnaround that typically lasts at least four weeks. In light of these plans, staff expects that the project will be adequately maintained to ensure acceptable reliability.

## **FUEL AND WATER AVAILABILITY**

For any power plant, the long-term availability of fuel and of water for cooling or process use is necessary to ensure reliability. The need for reliable sources of fuel and water is obvious; lacking long-term availability of either source, the service life of the plant may be curtailed, threatening the supply of power as well as the economic viability of the plant.

### **Fuel Availability**

Unit 7 will burn natural gas from the Pacific Gas and Electric (PG&E) system. Fuel availability is a function of both having sufficient resource and pipeline transportation capacity for delivery to the plant. The PG&E natural gas system has access to gas from the Rocky Mountains, Canada and the Southwest. This represents a resource of considerable capacity. This system offers access to far more gas than the plant would require. Therefore, fuel gas availability does not appear to be a concern for the project. The applicant proposes that gas be transmitted to the plant via an existing pipeline that is currently used to provide gas to the existing units at the site. The AFC describes that the proposed interconnection for Unit 7 will be made to the existing pipeline consisting of valves and pressure control and metering equipment (SECAL 2000a, AFC § 2.2.5.1). On April 12, 2001 Mirant submitted to Pacific Gas and Electric Company a "Formal Application for Modified Gas Service At Potrero Power Plant" (Mirant 2001a). This application reserves a spot in the service queue for Potrero Unit 7. PG&E has indicated that sufficient capacity exists on the current pipeline system to serve the requirements of the Potrero Unit 7 (O'Brian 2001, pers. comm.). Staff agrees with the applicant's prediction that there will be adequate natural gas supply and pipeline capacity to meet the project's needs.

### **Water Supply Reliability**

There will be two sources of water for the project. Water for cooling purposes will be supplied from the San Francisco Bay. The City of San Francisco will provide water for potable, process, and sanitary uses. Staff believes that these sources yield sufficient likelihood of reliable supplies of water. (For further discussion of water supply, see that portion of this document entitled **Water Resources**.)



## POWER PLANT RELIABILITY IN RELATION TO NATURAL HAZARDS

Natural forces can threaten the reliable operation of a power plant. Application of LORS in the design of the power plant will provide mitigations for events of high winds, which will not likely represent a hazard for this project, but flooding and seismic shaking (earthquake) present credible threats to reliable operation (see those portions of this document entitled **Facility Design** and **Geology and Paleontology**).

### Flooding

No natural streams or rivers are in the vicinity of the Unit 7 site and flooding has not been a problem for the existing facilities. Stormwater is channeled into storm drains due to the extensive urbanization in the site area. The project site is located at an elevation of 33.6 feet National Geodetic Vertical Datum (NGVD). Based on the Army Corps of Engineers Tidal Stage vs. Frequency Study (1984), the 100-year tide level in the area was 6.7 feet NGVD. The calculated maximum runup including 100-year tide, wind, and mean higher high water tide level is 13.0 feet NGVD. Because of its location, the San Francisco Energy Company has reported it in 1994 that a tsunami entering San Francisco Bay has the potential to cause runup at Potrero. If the 100-year tsunami occurred at the same time as the 100-year storm, the total runup would be 18.5 feet NGVD. Staff believes that there is no special concern with the power plant functional reliability affecting the electric system's reliability due to flooding events (SECAL 2000a, AFC § 8.14.1.3).

### Seismic Shaking

The site lies within Seismic Risk Zone 4 (SECAL 2000a, AFC § 2.3.1.1); see that portion of this document entitled **Geology and Paleontology**. The project will be designed and constructed to the latest appropriate LORS. Compliance with current LORS applicable to seismic design represents an upgrading of performance during seismic shaking, compared to older facilities, due to the fact that these LORS have been periodically and continually upgraded. By virtue of being built to the latest seismic design LORS, this project will likely perform at least as well as, and perhaps better than, existing plants in the electric power system. Staff has proposed conditions of certification to ensure this; see that portion of this document entitled **Facility Design**. In light of the historical performance of California power plants and the electrical system in seismic events, staff believes there is no special concern with power plant functional reliability affecting the electric system's reliability due to seismic events.

## COMPARISON WITH EXISTING FACILITIES

The North American Electric Reliability Council (NERC) keeps industry statistics for availability factors (as well as many other related reliability data). NERC continually polls utility companies throughout the North American continent on project reliability data through its Generating Availability Data System (GADS), and periodically summarizes and publishes the statistics on the Internet (<http://www.nerc.com>). NERC reports the following summary generating unit statistics for the years 1994 through 1998 (NERC 1999):

For Combined Cycle units (All MW sizes)  
Availability Factor = 91.49 percent

The equivalent classes of gas turbines that will be employed in the project have been on the market for several years now, and can be expected to exhibit typically high availability. The applicant's prediction of an annual availability factor of between 92 and 95 percent (SECAL 2000a, AFC § 2.4.1) appears reasonable compared to the NERC figure for similar plants throughout North America (see above). In fact, these new, large machines can well be expected to outperform the fleet of various (mostly older and smaller) gas turbines that make up the NERC statistics. Further, since the plant will consist of two parallel gas turbine generating trains, maintenance can be scheduled during those times of year when the full plant output is not required to meet market demand, typical of industry standard maintenance procedures. The applicant's estimate of plant availability therefore appears realistic. The stated procedures for assuring design, procurement and construction of a reliable power plant appear to be in keeping with industry norms, and staff believes they are likely to yield an adequately reliable plant.

## **FACILITY CLOSURE**

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Closure of the facility, whether planned or unplanned, cannot impact project reliability. Reliability impacts on the electric system from facility closure, should there be any, are dealt with in that portion of this document entitled **Transmission System Engineering**.

## **RESPONSES TO PUBLIC AND AGENCY COMMENTS ON THE PSA**

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### **CITY AND COUNTY OF SAN FRANCISCO (CCSF)**

**CCSF-16A:** *The PSA recognizes that equipment availability is essential to ensure reliable plant operations. The PSA should address whether the current energy crisis has affected the cost and availability of parts for natural gas-fired turbines.*

**Response:** Cost and availability of parts for gas turbines is addressed in the maintenance program. As discussed above under *Maintenance Program*, staff believes Unit 7 will be maintained in accordance with standard industry practices, which will ensure an acceptable level of reliability. This will include ensuring an adequate supply of parts.

**CCSF-16B:** *The PSA expresses concern that additional natural gas pipeline capacity will be necessary to ensure reliable supply if the proposed project, the 500 MW Golden Gate Project, and Hunters Point are all operating simultaneously....*

**Response:** Staff's concern has been allayed by the delay or cancellation of the Golden Gate project. As discussed above under *Fuel Availability*, staff believes that there will be adequate gas pipeline capacity to serve Unit 7.

## **CONCLUSIONS AND RECOMMENDATIONS**

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### **CONCLUSIONS**

Unit 7 will consist of a combined cycle plant with a two combustion turbine and one steam turbine configuration. Equipment technology will apply commercially proven designs with redundancy of critical components. Fuel is available from Pacific Gas and Electric Company, although expansion of their gas pipeline system may be required for delivery, and water supply from the San Francisco Bay for cooling purposes and the City of San Francisco for potable and process uses is adequate.

The applicant predicts an equivalent availability factor between 92 and 95 percent using the newest commercially proven equipment, which staff believes is achievable in light of the industry norm of 91 percent for all types of similar plants. Based on a review of the proposal, staff concludes that the plant will be built and operated in a manner consistent with industry norms for reliable operation. This should provide an adequate level of reliability.

### **RECOMMENDATION**

No conditions of certification are proposed.

### **REFERENCES**

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SECAL (Southern Energy California), 2000a. Application for certification, Potrero Power Plant Unit 7 Project (00-AFC-4). Submitted to the California Energy Commission, May 31, 2000.

Detmers, Jim. 1999. Director of Maintenance and Reliability, California Independent System Operator. Interview with Steve Baker (California Energy Commission), July 13, 1999.

Mavis, Steve. 1998. Transmission Planner, California Independent System Operator. Telephone conversation with Steve Baker (California Energy Commission), January 23, 1998.

Mirant (Mirant Corporation). 2001 a. Letter to Michael D. O'Brien, Pacific Gas & Electric Company, April 12, 2001.

O'Brian, Michael, 2001 Pacific Gas & Electric. Telephone conversation with James C. Henneforth (Consultant to California Energy Commission), September 25, 2001.

# TRANSMISSION SYSTEM ENGINEERING

Testimony of Mark Hesters and Al McCuen

## INTRODUCTION

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The Transmission System Engineering (TSE) analysis identifies whether or not the transmission facilities associated with the proposed project conform to all applicable laws, ordinances, regulations and standards (LORS) required for safe and reliable electric power transmission and assesses whether or not the applicant has accurately identified all interconnection facilities required as a result of the project.

Staff's analysis evaluates the power plant switchyard, outlet line, termination and downstream facilities identified by the applicant and provides proposed conditions of certification to ensure the project complies with applicable LORS during the design review, construction, operation and potential closure of the project.

Additionally, under the California Environmental Quality Act (CEQA), the Energy Commission must conduct an environmental review of the "whole of the action," that may include facilities not licensed by the Energy Commission (California Code of Regulations (CCR), Title 14, §15378). Therefore, the Energy Commission must identify and evaluate the environmental effect of construction and operation of any new or modified transmission facilities required for the project's interconnection to the electric grid and also beyond the project's interconnection with the existing transmission system that are required as a result of the power plant addition to the California transmission system. The California Independent System Operator (Cal-ISO) is responsible for ensuring electric system reliability for all participating transmission owning utilities and determines both the standards necessary to achieve reliability and whether a proposed project conforms with those standards. The Cal-ISO will provide testimony on these matters at the Energy Commission's hearings.

## SUMMARY OF CONCLUSIONS

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The Potrero Power Plant Unit 7 Project (Unit 7) switchyard and the facilities connecting to the PG&E grid through 115 kV lines to the Potrero and Hunters Point substations will be adequate. The power plant switchyard, outlet lines, and terminations are in accordance with good utility practices and are acceptable. Staff concludes that these facilities will comply with LORS, assuming the Conditions of Certification **TSE-1** through **TSE-7** are met.

Public Resources Code (PRC) section 25552 requires that the commission make findings on the public benefits of a project which include economic, environmental and reliability. Public benefits from an economic and reliability perspective are provided in the joint Cal-ISO/ Staff **Local System Effects** testimony.

## LAWS, ORDINANCES, REGULATIONS AND STANDARDS

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- California Public Utilities Commission (CPUC) General Order 95 (GO-95), “Rules for Overhead Electric Line Construction”, formulates uniform requirements for construction of overhead lines. Compliance with this order ensures adequate service and safety to persons engaged in the construction, maintenance, operation or use of overhead electric lines and to the public in general.
- CPUC General Order 128 (GO-128), “Rules for Construction of Underground Electric Supply and Communications Systems,” establishes uniform requirements and minimum standards to be used for underground supply systems to ensure adequate service and safety.
- CPUC Rule 21 provides standards for the reliable connection of parallel generating stations connected to participating transmission owners.
- Western Systems Coordinating Council (WSCC) Reliability Criteria provides the performance standards used in assessing the reliability of the interconnected system. These Reliability Criteria require the continuity of service to loads as the first priority and preservation of interconnected operation as a secondary priority. The WSCC Reliability Criteria includes the Reliability Criteria for Transmission System Planning, Power Supply Design Criteria, and Minimum Operating Reliability Criteria. Analysis of the WSCC system is based to a large degree on WSCC Section 4 “Criteria for Transmission System Contingency Performance” which requires that the results of power flow and stability simulations verify established performance levels. Performance levels are defined by specifying the allowable variations in voltage, frequency and loading that may occur on systems other than the one in which a disturbance originated. Levels of performance range from no significant adverse effect outside a system area during a minor disturbance (loss of load or facility loading outside emergency limits) to a performance level that only seeks to prevent system cascading and the subsequent blackout of islanded areas. While controlled loss of generation, load, or system separation is permitted in extreme circumstances, their uncontrolled loss is not permitted (WSCC 1998).
- North American Electric Reliability Council (NERC) Planning Standards provide policies, standards, principles and guides to assure the adequacy and security of the electric transmission system. With regard to power flow and stability simulations, these Planning Standards are similar to WSCC’s Criteria for Transmission System Contingency Performance. The NERC planning standards provide for acceptable system performance under normal and contingency conditions, however the NERC planning standards apply not only to interconnected system operation but also to individual service areas (NERC 1998).
- Cal-ISO’s Reliability Criteria also provide policies, standards, principles and guides to assure the adequacy and security of the electric transmission system. With regard to power flow and stability simulations, these Planning Standards are similar to WSCC’s Criteria for Transmission System Contingency Performance and the NERC Planning Standards. The Cal-ISO Reliability Criteria incorporate the WSCC Criteria and NERC Planning Standards. However, the Cal-ISO Reliability Criteria also provide some additional requirements that are not found in the WSCC Criteria

or the NERC Planning Standards. The Cal-ISO Reliability Criteria apply to all existing and proposed facilities interconnecting to the Cal-ISO controlled grid.

- Cal-ISO Scheduling Protocols and Dispatch Protocols require conformance with NERC, WSCC, and Local Area Reliability and Planning Criteria. These standards will be applied to the assessment of the system reliability implications of the Unit 7 project. Also of major importance to projects are the Cal-ISO Day/Hour Ahead Interzonal Congestion Management Scheduling Protocol (SP 10), the Transmission System Loss Management Scheduling Protocol (SP 4), and the Creation of the Real Time Merit Order Stack (SP 11). The Congestion Management Scheduling Protocol provides that the operation of power plants not violate system criteria when market participants request generation dispatch or the use of major interties. The Real Time Merit Order Stack is developed based on increasing energy bid prices so that the least cost bids are accepted early on and if congestion is anticipated the highest bids are not selected. The Transmission System Loss Management Scheduling Protocol uses the Cal-ISO power flow model to identify total transmission losses at each generating unit and scheduling point. Additional calculations are performed to determine the actual net power output required by the generating units to meet their scheduled obligations. (Cal-ISO 1998a, Cal-ISO 1998b).
- Cal-ISO Participating Generator Agreement consists of detailed explanations of the requirements in the Cal-ISO Tariff pertaining to the paralleled generating unit.

## **PROJECT DESCRIPTION**

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Mirant's Unit 7 is nominally rated at 540 MW and will produce a maximum of 615 MW. Unit 7 will connect to a new, double bus switchyard and from there to PG&E's electric transmission network. The new switchyard will connect to PG&E's Potrero substation, adjacent to the new switchyard, at 115 kV and to the Hunters Point substation via a new underground double-circuit 115 kV transmission line.

## **POWER PLANT SWITCHYARD**

The new power plant will consist of three generators, two combustion turbines and one steam generator. Each generator will have a dedicated oil-filled, delta-wye 18 kV to 115 kV step-up transformer. The high voltage side of the transformers will connect to the new Potrero Power Plant switchyard with bundled 2300 KCM aluminum line (SECAL 2000a, AFC page 2-21). This configuration is acceptable.

The new Potrero switchyard will be a double-bus switchyard. The double-bus configuration means the switchyard can be operated as two separate busses. The switchyard will be constructed in a ten-position ring-bus formation. The existing Potrero generating units, 3 through 6 and one of the new Unit 7 combustion turbines will connect to one side of the bus while the other new combustion turbine and the new steam generator of Unit 7 will connect to the other (SECAL 2000a, AFC page 2-22). This configuration for the switchyard is in accordance with industry standards and is acceptable.

## **TRANSMISSION LINE**

The Potrero Power Plant switchyard will connect to the PG&E electrical network through two new transmission lines. One line will connect to the Potrero substation adjacent to the switchyard and the other will connect to the Hunters Point substation via a new 1.8 mile 115 kV underground line. Output from the existing units 3 through 6 and one new gas turbine will go to the Potrero substation while the rest of the output from Unit 7 will be connected to the Hunters Point substation (SECAL 2000a, AFC pages 2-22 and 2-23). Figure 1 shows the transmission network in San Francisco.

To connect the Potrero switchyard to the Potrero substation, Mirant will use two 115 kV bundled circuits of 2300-KCM all-aluminum conductors (AAC). Existing towers will be modified to accommodate the new conductors (SECAL 2000a, AFC page 2-23). These transmission lines will be constructed in accordance with GO 21 and the configuration is acceptable.

To connect the Potrero Power Plant switchyard to the Hunters Point substation Mirant will use two new 115 kV 3-phase circuits of 2,300 KCM XLPE solid dielectric underground cables. These cables may be constructed by Hetch Hetchy Water and Power however this cable is still considered part of the Unit 7 project (Mirant 2001n). The cables will be buried in a trench six-feet deep and six-feet wide under the streets and in two thirty-inch pipes twenty to thirty feet below the bed of Islais Creek (SECAL 2000a, AFC figures 2-12 and 2-13). Mirant proposes to route this approximately 1.8 mile transmission line from the new Potrero switchyard south down Illinois Avenue, across Islais Creek, down Cargo Avenue, up Jennings Avenue and into the Hunters Point substation. In order to accommodate the new transmission line from Potrero, the Hunters Point substation will require two new interconnection bays, which will extend the bus from a six-position ring bus to an eight-position ring bus (SECAL 2000a, AFC page 2-23). The underground cable must comply with CPUC General Order 128. This configuration is acceptable.

## **EXISTING FACILITIES AND RELATED SYSTEMS**

See the Local System Effects section "Setting and Area Resources" for a complete description of the existing facilities and related systems.

## **ANALYSIS**

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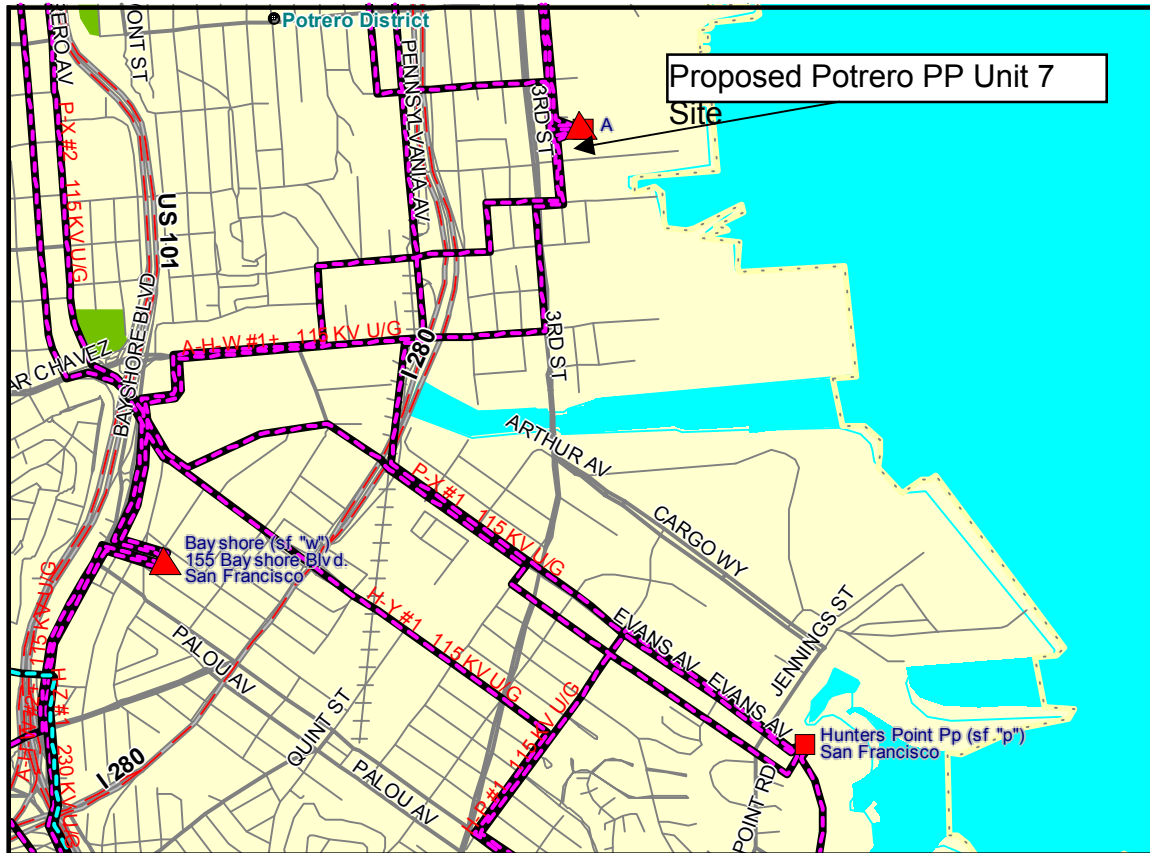
### **SYSTEM RELIABILITY**

#### **Introduction**

Mirant provided a preliminary interconnection study in their AFC (SECAL 2000a, AFC Appendix C. Staff received a Draft System Impact/Facilities Study (SI/FS) June 29, 2001 that was then superseded by the September 2, 2001 Draft System

**Figure 1**

Based upon information provided by Mirant Potrero, LLC, the proposed Potrero Power Plant Unit 7 Project will be located at the existing Potrero Power Plant. Figure 1 shows the area in which the project will be constructed.





Impact/Facility Study<sup>1</sup>. The June 29 study included the United Golden Gate I and II<sup>2</sup> projects; however, since those projects are no longer viable and are no longer in the interconnection queue they were removed from the September 2 study. The new study also assumed the Hunters Point Power Plant Units 1&4 would be shut down when Unit 7 began operation. The SI/FS and subsequent studies analyze the effects of connecting a new power plant to the existing electric grid and identify the potential impacts along with the proposed mitigation measures. Any new transmission facilities such as the power plant switchyard, the outlet line, and downstream facilities<sup>3</sup> required for connecting a project to the grid, are considered part of the “project” and are subjected to this environmental review process. Based on the results of the Draft SI/FS, Unit 7 will not cause significant line overloads under normal conditions. Transmission lines do overload under emergency or outage conditions, which will require mitigation, but significant downstream facilities will not be required.

### **Draft System Impact/Facilities Study Summary**

The Draft SI/FS analyzed the effects of Unit 7 on the transmission interconnection and system, included the following scope:

- **Steady State Power Flow Study:** These studies were conducted using PG&E’s 2004 Summer Peak Case Full Loop Base Case with a one-in-ten year summer peak load in the study area. A 2004 Fall Peak Full Loop Base Case was studied by removing the Potrero Power Plant Unit 3 for maintenance and modeling loads at 75% of those in the peak load study. The study analyzed adverse impacts to normal operating conditions. Further studies were conducted taking single and multiple lines out of service for contingency analysis.
- **Dynamic Stability Study:** Dynamic facility studies were performed for the Draft SI/FS.
- **System Protection Study:** The Draft SI/FS analyzed short-circuit fault duty.

As with all system studies, various assumptions were made and listed in the Draft SI/FS (Mirant 2001m, pages 9 and 10). The Draft SI/FS is intended to analyze the Unit 7 project, as well as other proposed generation projects, and to determine the impacts on the transmission grid. The study provides the basis for determining any system modifications, Remedial Action Schemes (RAS), or operational measures necessary to approve interconnection of the generation to the electrical transmission grid. Conclusions drawn from the study are highlighted below:

1. **Steady State and Contingency Power Flow Study:**
  - a. Under normal conditions, no overloads occurred.

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<sup>1</sup> The Draft System Impact/Facility Study is adequate for the FSA. The Final SI/FS will only refine the cost of interconnecting the power plant to PG&E’s system.

<sup>2</sup> The United Golden Gate Power Project Unit One did receive Commission certification but does not have control over the proposed site. United Golden Gate Power Project Two did not receive Commission certification and does not have control over the proposed site.

<sup>3</sup> Downstream facilities are those that are beyond the point where the line emanating from the power plant joins with the (existing) interconnected system. (see California Public Utilities Commission v. California Energy Resources Conservation and Development Commission (1984) 150 Cal. App. 3d 437 [197 Cal. Rptr. 866].)

- b. Mirant will be required to mitigate 115 kV overloads during contingencies. The mitigation will be a combination of System Protection Schemes (see Remedial Action Scheme) and the acceleration of approved PG&E transmission projects.
- 2. Dynamic Stability Study:
  - a. The Unit 7 project will not adversely impact the stable operation of the transmission system.
- 3. System Protection Study:
  - a. The System Protection Study analyzes the fault duty of circuit breakers and as mitigation requires the replacement of existing breakers with higher rated breakers. The System Protection Study identified fifty-four 115 kV breakers and two 60 kV breakers that PG&E believes Mirant should be responsible for upgrading. Many of these breakers would be overloaded before Unit 7 and the Cal-ISO has questioned the requirement that Mirant replace them. The upgrade of circuit breakers usually occurs within the fenceline of existing substations. The replacement of circuit breakers, for the purposes of this analysis, does not constitute significant downstream facilities and environmental impacts would be de minimis.

### **Cal-ISO Summary**

On February 21, 2001, the Cal-ISO issued a preliminary approval to connect the Mirant Unit 7 to the PG&E network through the Potrero and Hunters Point substations (Cal-ISO 2001a, page 3). The Cal-ISO will grant final approval for interconnection based on the results of the Detailed Facility Study, and will provide testimony on based the SI/DFS and their preliminary approval.

### **STUDY CONCLUSIONS**

The Preliminary Facility Study indicates that there are no major adverse transmission impacts with the proposed interconnection of Unit 7. Minor overloads identified through single and double contingency analysis can be mitigated by accelerating the construction of approved PG&E transmission projects and system protection schemes. The dynamic stability analysis showed that the Unit 7 project will not adversely impact the stable operation of the network. The short circuit duty study indicated that as many as 58 circuit breakers may need replacing, however many of these breakers are overloaded without the project and may not be the responsibility of the project owner. The Draft SI/FS did not identify the need for significant downstream facilities.

Staff concludes that the proposed Unit 7 will have no adverse unmitigated transmission impacts and could be approved with the proposed Staff conditions to ensure adequate design and installation of the facilities proposed. Final approval by the Cal-ISO will not be granted until a full review of the DFS is completed. The Condition of Certification, TSE-1e, provides for Commission review of this information. Based on the Draft SI/FS, the interconnection of Unit 7 will require no additional, significant transmission facilities.

## **TRANSMISSION ALTERNATIVES**

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In addition to construction of Unit 7 and a new switchyard adjacent to the Potrero Power Plant, the project also includes the proposed construction of a 1.8-mile single circuit 115 kV transmission line to the Hunters Point Substation. Mirant proposed the connection of the Potrero Power Plant Switchyard to the Hunters Point substation to avoid transmission line overloads. Alternatives to the proposed interconnection need to avoid or eliminate transmission line overloads. In the AFC Mirant considered one alternative route for the underground 115 kV line to the Hunters Point Substation and two interconnection alternatives. In consultations with staff, PG&E suggested several other interconnection alternatives.

## **TRANSMISSION LINE ROUTE ALTERNATIVES**

Mirant considered an alternative transmission route for the underground cable to the Hunters Point substation that went up 23<sup>rd</sup> Street to 3<sup>rd</sup> Street and from there to Evan's street (SECAL 2000a, AFC page 9-13). According to the AFC this alternative has significant drawbacks due to higher traffic flows on the surface streets which would be disrupted during construction and because these streets already have significant underground utilities. The CCSF supports the alternative transmission line route if this route could be constructed concurrent with construction of the Muni light rail line along 3<sup>rd</sup> Street. In this manner, the construction impacts could be consolidated and disruption would be minimized. However, the Muni construction is currently scheduled to begin before the proposed Unit 7 project would be approved.

## **INTERCONNECTION ALTERNATIVES**

Mirant also considered interconnecting Unit 7 to the Mission or Larkin substations instead of the Hunters Point substation. However, while these options eliminated transmission line overloads, they were inferior to the preferred Hunters Point interconnection because the Mission and Larkin substations are both indoors and have significantly less space than the Hunters Point substation (SECAL 2000a, AFC page C-3).

There may be other interconnection. The Potrero Substation is currently connected to the Bayshore Substation (located at 155 Bayshore Boulevard, about 1.6 miles away) with two 115 kV cables, to the Mission Substation (at 66 8<sup>th</sup> Street, about 2.7 miles away) with one 115 kV cable and to the Larkin Substation. PG&E stated that it "may be plausible" to tap in to the existing 115 kV cables and re-arrange termination points (as opposed to running new 115 kV cables to an existing substation). However, extensive and complex engineering analysis would be required to determine the viability of such options.

## **CUMULATIVE IMPACTS**

The operation of Unit 7 in conjunction with existing and anticipated generation projects in California will have no significant negative cumulative impacts. Unit 7's proposed location in the City and County of San Francisco (CCSF) places the project in a significant load center. Thus, the electricity produced by Unit 7 will primarily serve local electricity needs and will not impact the rest of California's transmission network. One other project, the 570 MW Golden Gate Power Phase II Project (GGPP-II) has been

proposed in the CCSF area. Electricity produced by the GGPP-II and Unit 7 project would serve local loads in the Greater Bay Area, and would not have significant cumulative impacts on the transmission network. Based on the original Draft SI/FS the UGG I and II projects in conjunction with Unit 7 will cause the slight (104% of the rated capacity) overload of the San Mateo – Belmont 115 kV line under normal conditions. However, this overload would most likely be avoided by the shut down of Hunters Point units 1 & 4 or system improvements planned by PG&E. Because these projects will provide power locally, their operation will not significantly impact transmission systems outside the San Francisco/Peninsula transmission corridor.

## **FACILITY CLOSURE**

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### **PLANNED CLOSURE**

This type of closure occurs in a planned and orderly manner such as at the end of its useful economic or mechanical life or due to gradual obsolescence. Under such circumstances, the owner is required to provide a closure plan 12 months prior to closure, which in conjunction with applicable LORS, is considered sufficient to provide adequately for safety and reliability. For instance, a planned closure provides time for the owner to coordinate with the Participating Transmission Owner (PTO), in this case PG&E, to assure (as one example) that the PTO's system will not be closed into the outlet thus energizing the project substation. Alternatively, the owner may coordinate with the PTO to maintain some power service via the outlet line to supply critical station service equipment or other loads.<sup>4</sup>

### **UNEXPECTED TEMPORARY CLOSURE**

An unplanned closure occurs when the facility is closed suddenly and/or unexpectedly for a short term due to unforeseen circumstances such as a natural or other disaster or emergency. During such a closure the facility cannot insert power into the utility system. Closures of this sort can be accommodated by establishing an on-site contingency plan (see **General Conditions Including Compliance Monitoring and Closure Plan**).

### **UNEXPECTED PERMANENT CLOSURE**

This unplanned closure occurs when the project owner abandons the facility. This is considered to be a permanent closure. This includes unexpected closure where the owner remains accountable for implementing the on-site contingency plan. It can also include unexpected closure where the project owner is unable to implement the contingency plan, and the project is essentially abandoned. An on-site contingency plan, that is in place and approved by the Energy Commission's Compliance Project Manager (CPM) prior to the beginning of commercial operation of the facilities, will be developed to assure safety and reliability (see **General Conditions Including Compliance Monitoring and Closure Plan**).

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<sup>4</sup> These are mere examples, many more exist.

## RESPONSES TO PUBLIC COMMENTS ON THE PSA

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### LEWIS C. EPSTEIN (LE)

**LE-1:** *Concerned that more above ground distribution will be built because Unit 7 is built.*

**Response:** Power will leave the Potrero Power Plant short above ground transmission lines and through longer underground cables. The power will then be delivered to loads in San Francisco via above ground distribution lines. The above ground lines are built to serve electricity loads. New above ground lines may be built to serve loads whether Unit 7 is built or not. These above ground lines are built to serve increases in electricity loads not supplies.

### ELLIOT GOLIGER (EG)

**EG-2:** *Elliot Goliger stated that high voltage wires should be underground.*

**Response:** In San Francisco the high voltage transmission lines are underground. The lower voltage distribution lines are above ground.

### KIM ROOKER (KR)

**KR-3:** *The power lines in the neighborhood affect video monitors and wireless reception in the Rooker residence. Kim is interested in seeing these above ground lines moved underground possibly as compensation for the air pollution from the new power plant. The proposed power plant will not affect the amount power flowing on the above ground transmission lines in the Potrero neighborhood.*

**Response:** The above ground lines (excluding those adjacent to the existing and proposed power plant) in the Potrero neighborhood are distribution lines that serve electricity loads. The amount of power flowing on these lines is dictated by the size of the loads they serve. The power generated by Unit 7 will be carried on underground lines until it reaches the distribution lines and will not affect the power flow on the distribution lines. Thus Unit 7 will not change the impacts of the existing power lines on video monitors or wireless reception in the Potrero neighborhood. Moving the distribution lines underground as mitigation for air impacts should be discussed in that section of this FSA.

## CONCLUSIONS AND RECOMMENDATIONS

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- Staff's concludes that no significant additional new transmission facilities, other than those proposed by the applicant, are required for the interconnection of the Unit 7 project to meet NERC, WSCC, and Cal-ISO reliability criteria.
- The Cal-ISO has provided preliminary approval of the Unit 7 interconnection.
- The power plant switchyard, outlet lines, and termination are acceptable and will comply with LORS assuming the proposed conditions of certification are implemented.

- The issuance of the Cal-ISO's final interconnection approval will assure conformance with NERC, WSCC and Cal-ISO reliability criteria. Conditions of Certification TSE-1e and TSE-1f provide for Energy Commission review of the Cal-ISO's final interconnection approval letter and the PG&E/applicant Generator Special Facilities Agreement.
- Staff proposes the following conditions of certification to insure system reliability and conformance with LORS.

## CONDITIONS OF CERTIFICATION

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**TSE-1** The project owner shall furnish to the CPM and to the CBO a schedule of transmission facility design submittals, a Master Drawing List, a Master Specifications List, and a Major Equipment and Structure List. The schedule shall contain a description and list of proposed submittal packages for design, calculations, and specifications for major structures and equipment. To facilitate audits by Energy Commission staff, the project owner shall provide designated packages to the CPM when requested.

**Verification:** At least 60 days (or a lesser number of days mutually agreed to by the project owner and the CBO) prior to the start of construction, the project owner shall submit the schedule, a Master Drawing List, and a Master Specifications List to the CBO and to the CPM. The schedule shall contain a description and list of proposed submittal packages for design, calculations, and specifications for major structures and equipment (see a list of major equipment in **Table 1: Major Equipment List** below). Additions and deletions shall be made to the table only with CPM and CBO approval. The project owner shall provide schedule updates in the Monthly Compliance Report.

<b>Table 1: Major Equipment List</b>
Breakers
Step-up transformer
Switchyard
Busses
Surge Arrestors
Disconnects
Take off facilities
Electrical Control Building
Switchyard control building
Transmission Pole/Tower

**TSE-2** Prior to the start of construction the project owner shall assign an electrical engineer and at least one of each of the following to the project: A) a civil engineer; B) a geotechnical engineer or a civil engineer experienced and knowledgeable in the practice of soils engineering; C) a design engineer, who is either a structural engineer or a civil engineer fully competent and proficient in the design of power plant structures and equipment supports; or D) a mechanical

engineer. (Business and Professions Code Sections 6704 et seq., require state registration to practice as a civil engineer or structural engineer in California.)

The tasks performed by the civil, mechanical, electrical or design engineers may be divided between two or more engineers, as long as each engineer is responsible for a particular segment of the project (e.g., proposed earthwork, civil structures, power plant structures, equipment support). No segment of the project shall have more than one responsible engineer. The transmission line may be the responsibility of a separate California registered electrical engineer. The civil, geotechnical or civil and design engineer assigned in conformance with Facility Design condition **GEN-5**, may be responsible for design and review of the TSE facilities.

The project owner shall submit to the CBO for review and approval, the names, qualifications and registration numbers of all engineers assigned to the project. If any one of the designated engineers is subsequently reassigned or replaced, the project owner shall submit the name, qualifications and registration number of the newly assigned engineer to the CBO for review and approval. The project owner shall notify the CPM of the CBO's approval of the new engineer. This engineer shall be authorized to halt earthwork and to require changes; if site conditions are unsafe or do not conform with predicted conditions used as a basis for design of earthwork or foundations.

The electrical engineer shall:

1. Be responsible for the electrical design of the power plant switchyard, outlet and termination facilities; and
2. Sign and stamp electrical design drawings, plans, specifications, and calculations.

**Verification:** At least 30 days (or a lesser number of days mutually agreed to by the project owner and the CBO) prior to the start of rough grading, the project owner shall submit to the CBO for review and approval, the names, qualifications and registration numbers of all the responsible engineers assigned to the project. The project owner shall notify the CPM of the CBO's approvals of the engineers within five days of the approval.

If the designated responsible engineer is subsequently reassigned or replaced, the project owner has five days in which to submit the name, qualifications, and registration number of the newly assigned engineer to the CBO for review and approval. The project owner shall notify the CPM of the CBO's approval of the new engineer within five days of the approval.

**TSE-3** The project owner shall keep the CBO informed regarding the status of engineering design and construction. If any discrepancy in design and/or construction is discovered, the project owner shall document the discrepancy and recommend the corrective action required. The discrepancy documentation shall become a controlled document and shall be submitted to the CBO for review and approval. The discrepancy documentation shall reference this condition of certification.

**Verification:** The project owner shall submit monthly construction progress reports to the CBO and CPM to be included in response to **TSE-3**. The project owner shall transmit a copy of the CBO's approval or disapproval of any corrective action taken to resolve a discrepancy to the CPM within 15 days. If disapproved, the project owner shall advise the CPM, within five days, the reason for disapproval, and the revised corrective action to obtain CBO's approval.

**TSE-4** For the power plant switchyard, outlet line and termination, the project owner shall not begin any increment of construction until plans for that increment have been approved by the CBO. These plans, together with design changes and design change notices, shall remain on the site for one year after completion of construction. The project owner shall request that the CBO inspect the installation to ensure compliance with the requirements of applicable LORS. The following activities shall be reported in the Monthly Compliance Report:

- a) receipt or delay of major electrical equipment;
- b) testing or energization of major electrical equipment; and
- c) the number of electrical drawings approved, submitted for approval, and still to be submitted.

**Verification:** At least 30 days (or a lesser number of days mutually agreed to by the project owner and the CBO) prior to the start of each increment of construction, the project owner shall submit to the CBO for review and approval the final design plans, specifications and calculations for equipment and systems of the power plant switchyard, outlet line and termination, including a copy of the signed and stamped statement from the responsible electrical engineer attesting compliance with the applicable LORS, and send the CPM a copy of the transmittal letter in the next Monthly Compliance Report.

**TSE-5** The project owner shall ensure that the design, construction and operation of the proposed transmission facilities will conform to all applicable LORS, including the requirements listed below. The substitution of Compliance Project Manager (CPM) and CBO approved "equivalent" equipment and equivalent substation configurations is acceptable. The project owner shall submit the required number of copies of the design drawings and calculations as determined by the CBO.

- a) The power plant switchyard and outlet line shall meet or exceed the electrical, mechanical, civil and structural requirements of CPUC General Order 95 or National Electric Safety Code (NESC), Title 8 of the California Code and Regulations (Title 8), Articles 35, 36 and 37 of the "High Voltage Electric Safety Orders", National Electric Safety Code (NEC) and related industry standards.
- b) Breakers and busses in the power plant switchyard and other switchyards, where applicable, shall be sized to comply with a short-circuit analysis.
- c) Outlet line crossings and line parallels with transmission and distribution facilities shall be coordinated with the transmission line owner and comply with the owner's standards.
- d) Termination facilities shall comply with CPUC Rule 21 and applicable interconnection standards.



- e) The project conductors shall be sized to accommodate the full output from the project.
- f) The project owner shall provide:
  - i) The final Detailed Facility Study (DFS) including a description of facility upgrades, operational mitigation measures, and/or Remedial Action Scheme (RAS) sequencing and timing if applicable,
  - ii) Executed Facility Interconnection Agreement
  - iii) Verification of Cal-ISO Notice of Synchronization.

**Verification:** At least 60 days prior to the start of construction of transmission facilities, the project owner shall submit to the CBO for approval:

- a) Design drawings, specifications and calculations conforming with CPUC General Order 95 or NESC, Title 8, Articles 35, 36 and 37 of the “High Voltage Electric Safety Orders”, NEC, CPUC Rule 21, applicable interconnection standards and related industry standards, for the poles/towers, foundations, anchor bolts, conductors, grounding systems and major switchyard equipment.
- b) For each element of the transmission facilities identified above, the submittal package to the CBO shall contain the design criteria, a discussion of the calculation method(s), a sample calculation based on “worst case conditions”<sup>5</sup> and a statement signed and sealed by the registered engineer in responsible charge, or other acceptable alternative verification, that the transmission element(s) will conform with CPUC General Order 95 or NESC, Title 8, California Code of Regulations, Articles 35, 36 and 37 of the, “High Voltage Electric Safety Orders”, NEC, CPUC Rule 21, applicable interconnection standards, and related industry standards.
- c) Electrical one-line diagrams signed and sealed by the registered professional electrical engineer in responsible charge, a route map, and an engineering description of equipment and the configurations covered by requirements **TSE-5** a) through f) above.
- d) The Facilities Study and signed letter from the applicant stating that mitigation is acceptable shall be provided concurrently to the CPM and CBO. Substitution of equipment and substation configurations shall be identified and justified by the project owner for CBO approval.

**TSE-6** The project owner shall inform the CPM and CBO of any impending changes, which may not conform to the requirements **TSE-5** a) through f), and have not received CPM and CBO approval, and request approval to implement such changes. A detailed description of the proposed change and complete engineering, environmental, and economic rationale for the change shall accompany the request. Construction involving changed equipment or substation configurations shall not begin without prior written approval of the changes by the CBO and the CPM.

**Verification:** At least 60 days prior to the construction of transmission facilities, the project owner shall inform the CBO and the CPM of any impending changes which may not conform to requirements of **TSE-5** and request approval to implement such changes.

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<sup>5</sup> Worst case conditions for the foundations would include for instance, a dead-end or angle pole.

**TSE-7** The applicant shall provide the following Notice to the California Independent System Operator (Cal-ISO) prior to synchronizing the facility with the California Transmission system:

1. At least one (1) week prior to synchronizing the facility with the grid for testing, provide the Cal-ISO a letter stating the proposed date of synchronization; and
2. At least one (1) business day prior to synchronizing the facility with the grid for testing, provide telephone notification to the ISO Outage Coordination Department, Monday through Friday, between the hours of 0700 to 1530 at (916)-351-2300.

**Verification:** The applicant shall provide copies of the Cal-ISO letter to the CPM when it is sent to the Cal-ISO one (1) week prior to initial synchronization with the grid. A report of conversation with the Cal-ISO shall be provided electronically to the CPM one (1) day before synchronizing the facility with the California transmission system for the first time.

**TSE-8** The project owner shall be responsible for the inspection of the transmission facilities during and after project construction, and any subsequent CPM and CBO approved changes thereto, to ensure conformance with CPUC GO-95 or NESC, Title 8, CCR, Articles 35, 36 and 37 of the, "High Voltage Electric Safety Orders", applicable interconnection standards, NEC and related industry standards. In case of non-conformance, the project owner shall inform the CPM and CBO in writing, within 10 days of discovering such non-conformance and describe the corrective actions to be taken.

**Verification:** Within 60 days after first synchronization of the project, the project owner shall transmit to the CPM and CBO:

- a) "As built" engineering description(s) and one-line drawings of the electrical portion of the facilities signed and sealed by the registered electrical engineer in responsible charge. A statement attesting to conformance with CPUC GO-95 or NESC, Title 8, California Code of Regulations, Articles 35, 36 and 37 of the, "High Voltage Electric Safety Orders", CPUC GO-21, and applicable interconnection standards, NEC, related industry standards, and these conditions shall be provided concurrently.
- b) An "as built" engineering description of the mechanical, structural, and civil portion of the transmission facilities signed and sealed by the registered engineer in responsible charge or acceptable alternative verification. "As built" drawings of the mechanical, structural, and civil portion of the transmission facilities shall be maintained at the power plant and made available, if requested, for CPM audit as set forth in the "Compliance Monitoring Plan".

A summary of inspections of the completed transmission facilities, and identification of any nonconforming work and corrective actions taken, signed and sealed by the registered engineer in charge.

## REFERENCES

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WSCC (Western Systems Coordinating Council) 1997. Reliability Criteria, August 1998.

SECAL (Southern Energy California). 2000a. Application for Certification, Potrero Power Plant Unit 7 Project (00-AFC-4). Submitted to the California Energy Commission, May 31, 2000.

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Mirant (Mirant Corp) 2001n Mirant Potrero, LLC's response to data request no. 212 docketed September 7, 2001.

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## DEFINITION OF TERMS

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AAC	All Aluminum conductor.
Ampacity	Current-carrying capacity, expressed in amperes, of a conductor at specified ambient conditions, at which damage to the conductor is nonexistent or deemed acceptable based on economic, safety, and reliability considerations.
Ampere	The unit of current flowing in a conductor.
Bundled	Two wires, 18 inches apart.
Bus	Conductors that serve as a common connection for two or more circuits.
Conductor	The part of the transmission line (the wire) which carries the current.
Congestion Management	Congestion management is a scheduling protocol, which provides that dispatched generation and transmission loading (imports), will not violate criteria.
Emergency Overload	See Single Contingency. This is also called an L-1.
Kcmil or kcm	Thousand circular mil. A unit of the conductor's cross sectional area, when divided by 1,273, the area in square inches is obtained.
Kilovolt (kV)	A unit of potential difference, or voltage, between two conductors of a circuit, or between a conductor and the ground.
Loop	An electrical cul de sac. A transmission configuration which interrupts an existing circuit, diverts it to another connection and returns it back to the interrupted circuit, thus forming a loop or cul de sac.
Megavar	One megavolt ampere reactive.
Megavars	Mega-volt-Ampere-Reactive. One million Volt-Ampere-Reactive. Reactive power is generally associated with the reactive nature of motor loads that must be fed by generation units in the system.
Megavolt ampere (MVA)	

A unit of apparent power, equals the product of the line voltage in kilovolts, current in amperes, the square root of 3, and divided by 1000.

**Megawatt (MW)**

A unit of power equivalent to 1,341 horsepower.

**Multiple Contingencies**

A condition that occurs when more than one major transmission element (circuit, transformer, circuit breaker, etc.) or more than one generator is out of service

**Normal Operation/ Normal Overload**

When all customers receive the power they are entitled to without interruption and at steady voltage, and no element of the transmission system is loaded beyond its continuous rating.

**N-1 Condition**

See Single Contingency.

**Outlet**

Transmission facilities (circuit, transformer, circuit breaker, etc.) linking generation facilities to the main grid.

**Power Flow Analysis/FS**

A power flow analysis/FS is a forward looking computer simulation of essentially all generation and transmission system facilities that identifies overloaded circuits, transformers and other equipment and system voltage levels.

**Reactive Power**

Reactive power is generally associated with the reactive nature of motor loads that must be fed by generation units in the system. An adequate supply of reactive power is required to maintain voltage levels in the system.

**Remedial Action Scheme (RAS)**

A remedial action scheme is an automatic control provision, which, for instance, will trip a selected generating unit upon a circuit overload.

**SF6**

Sulfur hexafluoride is an insulating medium.

**Single Contingency**

Also known as emergency or N-1 condition, occurs when one major transmission element (circuit, transformer, circuit breaker, etc.) or one generator is out of service.

**Solid dielectric cable**

Copper or aluminum conductors that are insulated by solid polyethylene type insulation and covered by a metallic shield and outer polyethylene jacket.

**Switchyard** A power plant switchyard (switchyard) is an integral part of a power plant and is used as an outlet for one or more electric generators.

**Thermal rating**  
See ampacity.

**TSE** Transmission System Engineering.

**Undercrossing**  
A transmission configuration where a transmission line crosses below the conductors of another transmission line, generally at 90 degrees.

**Underbuild**  
A transmission or distribution configuration where a transmission or distribution circuit is attached to a transmission tower or pole below (under) the principle transmission line conductors.

# **LOCAL SYSTEM EFFECTS (PRELIMINARY)**

Mark Hesters, Ajoy Guha, Larry Tobias, Ty Larson,  
Jeff Miller and Al McCuen

## **INTRODUCTION**

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This testimony was jointly prepared by California Energy Commission and California Independent Operator (Cal-ISO) staffs and provides an analysis of the local electric system effects of the Potrero Power Plant Unit 7 Project (Unit 7) and our conclusions regarding these effects. Local system effects are the localized electrical benefits and impacts that can be attributed to the addition of a new generator to the grid. The effects assessed in this testimony include: the potential to defer capital investments, the effect on system losses, the impact on operational reliability and flexibility, and the ability of Unit 7 to be integrated into the existing and planned system.

The evaluation of local system effects has been included to provide a greater understanding of the effect of the addition of Unit 7 to the grid. Conformance with reliability criteria is addressed in the Transmission System Engineering testimony and the System Reliability testimony of the Cal-ISO.

Generally, there are two ways to supply power to the San Francisco peninsula. Power may be produced and distributed locally, or power may be produced remotely and shipped into the area on transmission facilities. The amount of power that can be supplied from remote locations is limited by the capacity of the transmission facilities serving the area. Unit 7, if approved and built, would insert as much as 615<sup>5</sup> megawatts (MW) of real power and 400 megavars of reactive power (MVAR) into the grid, which in turn would help maintain the ability of the Bay Area grid to transport power<sup>6</sup>. As a result, Unit 7 plays a key role (along with future transmission upgrades) in the long-term plan to retire older, unreliable Bay Area power plants. Unit 7 will also reduce system losses, and will increase operational flexibility and reliability.

## **SUMMARY OF CONCLUSIONS**

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1. The addition of Unit 7 will substantially reduce transmission system losses. Over 20 years, the savings to ratepayers have a present value between \$55 million and \$80 million. As well as reducing the cost of producing power in California, these loss savings would also contribute to

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<sup>5</sup> According to Mirant's preliminary interconnection study the maximum net output of the proposed Unit 7 is 615 MW.

<sup>6</sup> In general, electrical energy defined by "real power" measured in megawatts is used to supply lighting, motors, computers and numerous other appliances. "Reactive power", measured in megavars, supplies voltage support to transport the energy through the electrical transmission system. Real power flow on transmission facilities must not exceed the capability of the transmission facilities. When real power flow is projected to exceed the capability of transmission facilities, either steps must be taken to limit the power flow, or additional or higher capacity equipment must be installed. If reactive power is insufficient, system voltages will decrease, which could lead to the controlled dropping of customer loads (rolling blackouts) and even the uncontrolled loss of load associated with voltage collapse.

a related decrease in the use of fossil fuels, water, and the production of air emissions, by reducing the need for additional generation resources.

2. Unit 7 would be a significant source of real and reactive power that would serve loads in the immediate San Francisco Peninsula Area, the result of which would be a substantial reduction in the need to import power over already-stressed transmission facilities. Staff notes that if Hunters Point Power Plant is retired once Unit 7 is added, the addition of Unit 7 would not lead to the deferral of any currently planned transmission facilities. Rather, Unit 7 would offset the need for *other additional* future transmission reinforcements (beyond those already in the transmission plan). Unit 7 will displace significant transmission upgrades that would be required to maintain reliability if Hunters Point Power Plant is retired without the addition of generation in San Francisco.
3. A primary benefit of the addition of Unit 7 is that it would add generation that is much more reliable and environmentally-compatible than the generation that is currently in place in the San Francisco Peninsula. Because of their advanced ages, existing generating plants on San Francisco Peninsula are unreliable and it is uncertain how much longer they can continue to operate. Moreover, these existing units are either run-time limited, or de-rated (in terms of maximum output), due to emission output limitations and will likely require further upgrades to remain in operation in coming years.
4. Unit 7's additional generation will provide greater flexibility within the Bay Area for the Cal-ISO, Pacific Gas and Electric Company (PG&E), and generation owners to schedule maintenance on transmission facilities and generating units. Also, during periods of high demand, Unit 7 will provide a critically-needed margin of generation, and the flexibility to manage adverse and unexpected conditions.

## **LAWS, ORDINANCES, REGULATIONS AND STANDARDS (LORS)**

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Where appropriate the authors have utilized Western States Coordinating Council, National Energy Reliability Council and Cal-ISO Grid Planning Standards regarding outages and system reactive margin criteria to assess the benefits or detriments of the Unit 7 project.

To assure that energy implications are considered in project decisions, California Environmental Quality Act (CEQA) guidelines require that environmental analyses include a discussion of the potential energy impacts of proposed projects with particular emphasis on avoiding or reducing inefficient, wasteful and unnecessary consumption of energy. The CEQA guidelines also require that the decision-maker consider "[t]he effects of the project on local and regional energy supplies and on requirements for additional capacity,..." (CEQA Appendix F).

## **SETTING AND AREA RESOURCES**

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The San Francisco Peninsula area is composed of the City and County of San Francisco, and the area between the San Mateo substation and San Francisco. Major transmission lines feed the area through the San Mateo and Martin substations, which connect to the



230kV system (see Figure 1). The 2001 demand forecast for a 1-in-10 year adverse weather condition in 2005 for San Francisco and the Peninsula is approximately 1,400 MW (see Alternatives Analysis of this document). Power is supplied to the San Francisco Peninsula area by generation located in the area and across major transmission lines that bring in power from other areas.

## GENERATION

The forecasted total local generation in year 2004 is 598 MW (363 MW from Potrero Power Plant and 215 MW from Hunters Point Power Plant).

**LOCAL SYSTEM EFFECTS Table 1**  
**San Francisco Peninsula Generation**

Plant	Unit	Size (MW)	Fuel Type	In-service Date	Operating Restrictions
Potrero	3	207	Natural Gas	1965	Bay Area NOx restrictions
	4	52	Distillate	1976	877 hours/year
	5	52	Distillate	1976	877 hours/year
	6	52	Distillate	1976	877 hours/year
Hunters Point	1	52	Distillate	1976	877 hours/year
	2*	0	None	1948	(107 MVAR)
	3*	0	None	1949	(107 MVAR)
	4	163	Natural Gas	1958	Bay Area NOx restrictions
United Cogen	1	20	Natural Gas	1986	none

\*Hunters Point units 2 and 3 are now operating as Synchronous condensers.

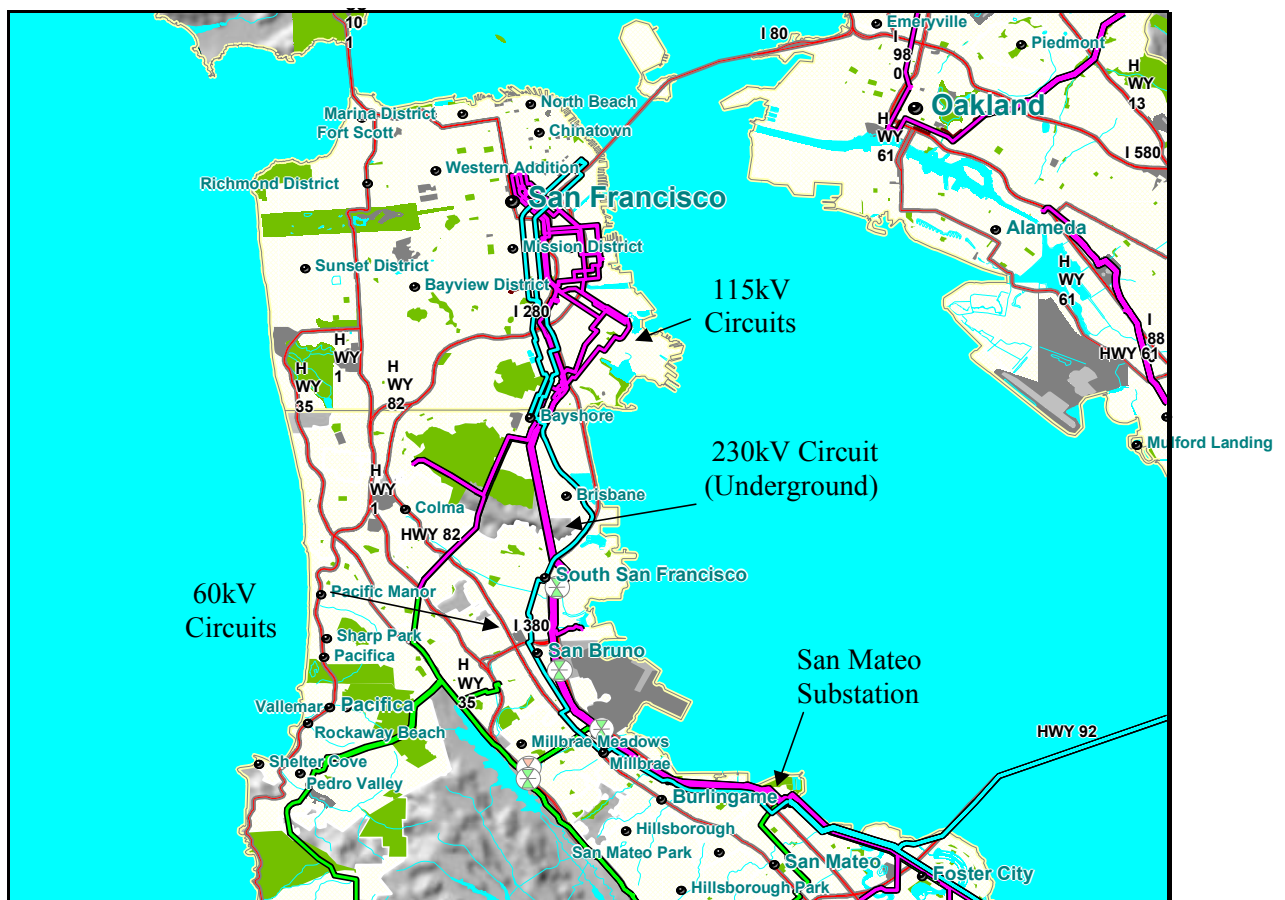
The existing generation in San Francisco is highly vulnerable to disruption. The Potrero and the Hunters Point power plants are old and tend to have frequent outages. The units at these plants are unreliable enough that the Cal-ISO generally assumes that two units will be unavailable at any given time. The largest and most critical generating unit on the peninsula is Potrero Unit 3 (a steam thermal generating unit) which began operating in 1965 and is significantly beyond the expected 30-year life of a power plant of its type. Hunters Point Unit 4 is 44 years old. Both Potrero Unit 3 and Hunters Point Unit 4 will require significant upgrades over the coming years to be able to meet diminishing NOx emission limits.

Potrero Power Plant Units 4, 5, and 6 (52 MW each for a total of 156 MW) and Hunters Point Unit 1, are combustion turbines that operate on distillate fuel with high air pollution emissions. These turbines are restricted in operation to 877 hours (or about ten-percent of a given calendar year) each due to air district permits. In addition, an existing agreement between the City and County of San Francisco and PG&E calls for the shut down of the Hunters Point Power Plant when that plant is no longer needed for reliability.

## TRANSMISSION

The San Francisco Peninsula receives its power from three sources. Part of the demand is served by power generated locally by San Francisco generation. Approximately another third of the power needed for the San Francisco Peninsula is served by power delivered at the San Mateo Substation from 230kV transmission lines connecting the Tesla, Newark and Ravenswood substations. The remaining third of the San Francisco Peninsula demand is met through power delivered to the San Mateo substation via two 230kV lines crossing San Francisco Bay. Power flows northward along the Peninsula from the San Mateo Substation to the Martin Substation through the combination of one 230kV transmission line, five 115kV transmission lines, and one 60kV transmission line (see Figures 1&2).

**Figure 1**  
***Geographical Map of the San Francisco and Peninsula Corridor Area<sup>7</sup>***

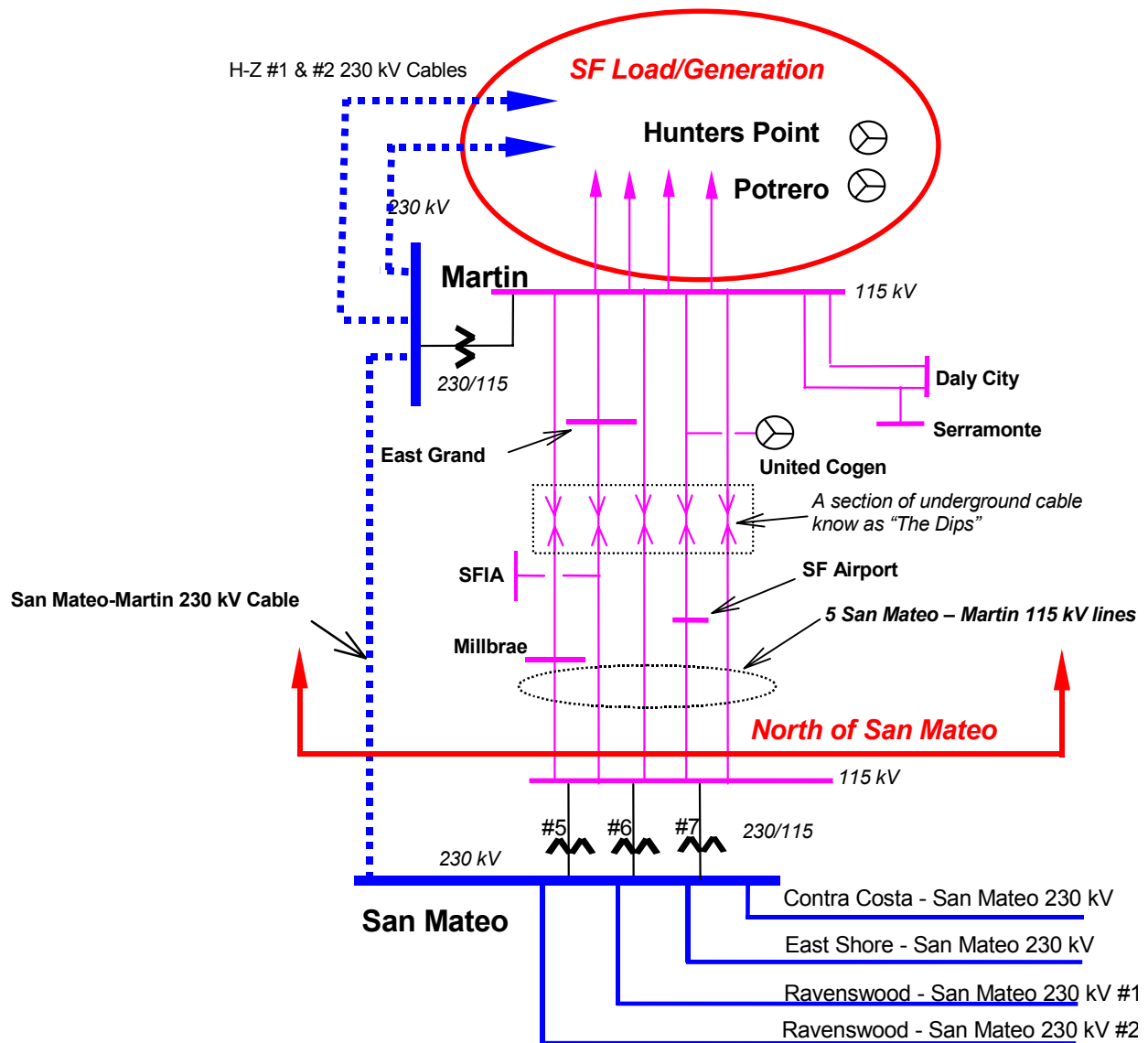


Synchronous condensers located at the Hunters Point Power Plant are used to maintain voltages in the area. Numerous small shunt capacitors are also used within the local electric distribution system to maintain voltages by supplying reactive power support. Reactive

<sup>7</sup> PG&E, San Francisco Peninsula Long-Term Electric Transmission Planning Study, Page 11.

power support cannot be transmitted over long distances and needs to be provided locally. While it is possible to operate a system devoid of local generation, in San Francisco's case this would require substantial new transmission lines to import the required quantity of power, and additional local voltage support devices (i.e., synchronous condensers, shunt capacitors, etc.).

**FIGURE 2**  
**Sketch of San Francisco Peninsula Transmission System**



## MAXWELL ORDINANCE

An important consideration in determining the benefits of Unit 7 project is the Maxwell ordinance which was approved by the San Francisco Board of Supervisors on May 29, 2001.

This ordinance sets several requirements for City staff to consider to support the permitting of Unit 7. Briefly these requirements are:

- Hunters Point Power Plant will cease operation as a fossil generation plant within 90 days of the operation of Unit 7.
- Potrero Power Plant Units 4 through 6 will be retrofitted or rebuilt with the best available pollution control technology (BACT) and will operate only during specified times.
- Potrero Power Plant Unit 3 will shut down as soon as it is no longer needed to sustain electric reliability in San Francisco. (CCSF Ord, Pages 2-4).

## LOCAL SYSTEM EFFECTS

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The following types of local system effects have been reviewed to assess the potential benefits of local generation:

1. **The Effect on Plans for Transmission Facility Upgrades:** Deferral of capital facilities is determined by identifying proposed facilities for which need is delayed or eliminated because a target generator offsets the need for such facilities.
2. **The Effect on System Losses:** Comparing the system with and without Unit 7 interconnected and operating identifies the increase or decrease in losses.
3. **The Effect on Operational Reliability and Flexibility:** Operational reliability includes an evaluation of whether or not Unit 7 would provide increased or decreased operational flexibility and reliability and a general discussion of Unit 7's possible effect on reliability must-run (RMR) costs (see Definition of Terms).
4. **Ability to be integrated into existing and planned system:** Would major system additions or system modifications be needed to accommodate the new facility.

## THE EFFECT ON PLANS FOR TRANSMISSION FACILITY UPGRADES

As stated earlier, power is supplied to customers on the San Francisco Peninsula either through local generation or through transmission facilities that run in a northward loop along the Peninsula from the San Mateo Substation. Therefore additional generation on the Peninsula can reduce the need for additional transmission facilities into the Peninsula. To determine the need for these new facilities, one must first determine the amount of generation that can be assumed to be available in the planning studies.

The Cal-ISO Grid Planning Standard requires that the system be able to supply all electric loads in an area during the combined outage of the most critical single transmission line in plus the outage of the most critical generating unit. In addition, in the Bay Area, the grid planning standards require that one of the 52 MW turbines on the Peninsula be removed from service as well. Before the addition of Potrero Unit 7, the most critical single unit outage

would be Potrero Unit 3 (207 MW). After the addition of Unit 7, the most critical outage would be Unit 7 (615 MW)<sup>8</sup>.

A plan has already been developed for transmission upgrades to the Bay Area system, prior to the addition of Potrero Unit 7. This plan was completed the San Francisco Study Group (a group of stakeholders including PG&E, the California ISO, the City and County of San Francisco, and other interested stakeholders) in October of 2000. To address the problems identified in the studies, the following additions were required:

1. Upgrade the 60kV San Mateo – Martin #4 circuit to 115kV.
2. Reconductor the underground “dips” of the 115kV lines between San Mateo and Martin Substation.
3. Add a new 2.4-mile Hunters Point-Potrero 115kV underground cable
4. Add a new 25-mile 230kV transmission line from the Jefferson substation to Martin substation which includes the following transmission system changes:
  - a. Install a new 230 kV circuit from Jefferson to Martin by rebuilding the Jefferson-Martin 60 kV double circuit tower line to a 230 kV double circuit tubular steel pole line and installing a 230 kV underground cable.
  - b. Install a new 400 MVA, 230kV underground cable approximately 8 miles between Sneath Lane and Martin Substations.
  - c. Construct a new transition station near Sneath Lane Substation for overhead to underground transition.
  - d. Rebuild the remaining 15 miles to 230 kV double circuit tubular steel pole line. String one position with 2-1113 kcmil AAL conductors for 230 kV operation and the other position with 1-1113 kcmil AAL conductor for 60 kV operation.
  - e. Install one 230 kV line position at Jefferson to accommodate 2-1113 kcmil AAL conductor/phase. Install necessary equipment to operate Jefferson 230 kV bus as a ring bus.
  - f. Install two 60 kV line positions at Sneath Lane, Carolands, and Ralston to accommodate one 1113 kcmil AAL conductor/phase. All of these substations will be looped. Crystal Spring Substation will be tapped off the new Jefferson-Sneath Lane 60 kV circuit.
  - g. Install one 60 kV line position at Millbrae.
  - h. Build a 60 kV line section between the new line position and tower ¼ of the Millbrae tap. This would allow the Millbrae tap to be unparallelled and looped off the Jefferson-Sneath Lane 60 kV circuit.

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<sup>8</sup> Currently Potrero Unit 7 is considered a single contingency because two common mode failures have been identified (the condenser and cooling water system). This determination (to consider Potrero Unit 7 a single contingency) could change if the plant is reconfigured to eliminate the common mode of failure or if it is determined that a condenser or cooling water system failure is sufficiently unlikely to be ignored for planning purposes. The Cal-ISO has encouraged Mirant to reconfigure the plant so that common mode(s) of failure are eliminated so that the likelihood and severity of an entire plant outage are reduced.

- i. Replace motor operated switches at Pacifica and Half Moon Bay with 60 kV breakers. These breakers would operate normally closed.
- j. Reconductor San Mateo to Burlingame 60 kV section of the San Mateo-Martin Circuit 4 from 4/0 Cu to 477 SSAC.

The first three projects are likely to be completed before Unit 7 is scheduled to be operating. The Jefferson-Martin 230kV line is currently scheduled to be in place by 2005 (assuming that it is approved by the CPUC). With these transmission projects and other system reinforcements, the San Francisco Peninsula region is projected to meet reliability criteria through the year 2009. This assumes that Potrero 3 will remain in-service through 2009 and will be retrofitted to meet emission requirements by the end of 2004.

In addition to the above-mentioned projects, there is another transmission project, currently sponsored by the City and County of San Francisco, for a second 2.4-mile Hunters Point – Potrero 115 kV underground cable. While this project is driven in part by other needs, it also supports the addition of Unit 7. The Cal-ISO, PG&E and other members of the San Francisco Study Group agree that this second cable is a necessary complement to the construction of Unit 7.

The replacement of Hunters Point Power plant with Unit 7 would marginally decrease the amount of generation in the area that can be assumed available while planning the system. This 8 MW reduction in generation assumed in planning studies is not sufficient to change the timing or scope of the transmission upgrades currently planned for the San Francisco Peninsula. Potrero Unit 7 will provide dynamic reactive power support and help maintain system voltage and prevent voltage collapse under severe contingency conditions.

The current plan is predicated on the continued availability of the existing generating units within the San Francisco area. Recent history has shown that full output of the existing generating units could be significantly limited by Bay Area NOx limitations and frequent maintenance outages. Concerns associated with the availability of generation from the existing Potrero and Hunters Point power plants are discussed in greater depth in the section on “System Operation Benefits.”

While adding Unit 7 would not change the current plan for transmission system additions, Unit 7 would provide long-term benefits. In the long-term, the existing generation at Hunters Point and Potrero will either be retired which will lead to the need for local resources (generation, load reductions) or major new transmission facilities or will require significant upgrades. The addition of Unit 7 eliminates the need to undertake one of the following:

- 1) add more generation in San Francisco or the Peninsula,
- 2) significantly upgrade/retrofit generation at the Potrero Power Plant, or
- 3) add transmission facilities.

## **THE EFFECT ON SYSTEM LOSSES**

Transmission system losses are a function of generation schedules, imports, exports, wheeling and system loop flow in addition to load. Transmission line losses occur as a result of conductor resistance and corona discharge. Resistance line losses are significant, especially on long, heavily loaded lines with a high load factor (75% - 100%). Typical values

for utility systems in California range from 12 kW/mile to 500 kW/mile for line loadings between 25% and 100% of the conductor ratings. Resistance line losses are generally described as  $I^2R$  heating dissipation losses. These losses are similar to the operation of electric strip heaters for home and building use where heat is produced by connecting a resistor heating element across 120V or 240V, and allowing the current to flow through the resistor element.

Based on the predicted 2004 Northern California system peak demand of 27,300 MW, the primary system losses (transmission lines and transformers) are approximately 889 MW without Unit 7 operating. Transmission losses thus constitute 3.3% of the load.

Transmission line losses were assessed for 6 dispatch scenarios. These dispatch scenarios were selected to bracket the range of dispatch conditions that occur in an actual year. Because the power supplied to the system must equal the system load plus the losses, when Unit 7 operates, 615 MW of generation as shown by the dispatch scenarios must be reduced to balance the additional 615 MW from Unit 7. The baseline for comparison was the system losses without Unit 7. Losses with Unit 7 on line and other units redispatched according to the established dispatch scenarios were then compared to the baseline.

The following dispatch scenarios were studied for the year 2004 to allow for the addition of the 615 MW Unit 7:

1. Moss Landing down 352 MW, Helms down 263 MW
2. Moss Landing down 615 MW
3. La Paloma down 615 MW
4. Pittsburg down 500 MW, Contra Costa down 115 MW
5. Sutter down 525 MW, Rio Linda down 90 MW
6. Northwest Imports down 615 MW

By adding Unit 7 and reducing generation as depicted in Dispatch Scenarios 1-6, system peak loss reductions range between 42 MW and 102 MW for the different scenarios (See Table 2 at the end of this document). This is a substantial system benefit. The additional 42 to 102 MW is "produced" without the use of any additional fuel or water and without producing any additional plant emissions.

To estimate the annual energy savings the authors assigned probabilities to the various dispatch scenarios tested. Multiplying the unique dispatch related loss values by the assigned dispatch probability provided an expected overall MW loss value for each study year: 58 MW in 2004. The estimated annual energy savings that correspond to the expected overall system loss reduction values noted above are 156 GWh in year 2004. These amounts of energy savings are equivalent to the annual energy requirement for approximately 22,000 homes. A reduction in system losses of this magnitude would save ratepayers \$5 to \$8 million per year. Over a twenty-year period, the present value of these savings to ratepayers is \$55 to \$80 million. In calculating these values for the loss savings, the following assumptions were made:

- Natural gas prices are \$4 - \$5/MMBtu,
- The displaced unit's heat rate is 12,000 – 13,000 Btu/kWh,
- Any emissions offsets created were valued at \$0 (a very conservative assumption), and
- The rate of return is 8%.

The calculations for this analysis are contained in Appendix 1 for study year 2004.

To assure that energy implications are considered in project decisions, environmental documents must include a discussion of the potential energy impacts of proposed projects. This discussion places particular emphasis on avoiding or reducing inefficient, wasteful and unnecessary consumption of energy and the project's effect on local and regional energy supplies. Most decision-makers generally are faced with only the negative energy use considerations when approving a project that may result in significant increased use of energy. This Commission faces a different situation in that Unit 7 will substantially reduce energy losses while providing numerous benefits. If one anticipates that Unit 7, if built, would operate for at least 20 years, there are substantial long-term environmental benefits related to reduced fuel and water use and to reduced emissions due to the reduction in electricity system losses.

## **SYSTEM OPERATIONAL RELIABILITY AND FLEXIBILITY BENEFITS**

### ***OPERATIONAL RELIABILITY AND FLEXIBILITY***

As described earlier, the existing generation in San Francisco is highly vulnerable. The existing generation units at the Potrero and Hunters Point power plants are old and tend to have frequent outages. Moreover, the plants face increasing challenges in meeting NOx limitations that are scheduled to be reduced over coming years.

Potrero Unit 3 (a steam thermal generating unit) began operating in 1965 and is significantly beyond the expected 30-year life of a power plant of this type. Hunters Point Unit 4 is 44 years old. Due to their age, these plants tend to break down and require significant amounts of maintenance. The reliability of these units has increasingly worsened, usually resulting in portions of the plant(s) being curtailed or placed out of service.

Power plant de-rates challenge local area operations, and place an undue strain on already stressed transmission facilities. It is not uncommon to find more than one San Francisco resource off-line and unavailable at any given time. Absent this local generation, it is often extremely difficult, if not impossible, to clear existing transmission equipment to perform planned maintenance or construction. Forced outages of transmission equipment with reduced local generation can lead to significantly reduced reliability (an increased likelihood of involuntary local area load shedding or rolling blackouts).

In addition, Potrero Unit 3 and Hunters Point Power Plant Unit 4 are subject to NOx emission limitations that are slated to be reduced over the coming three years. Both these units are subject to a NOx emissions "bubble" that applies to the boilers owned by Mirant and PG&E, respectively, in the greater Bay Area. The bubble requires owners to operate their fleet of



boilers to meet an average NOx output level that will decrease in the next few years as follows:

2002 = 47 parts-per-million (PPM)

2003 = 47 PPM

2004 = 31 PPM

2005 and beyond = 15 PPM

Currently, the output from Potrero Unit 3 has been limited by Mirant due to the NOx emission bubble, pending NOx reduction upgrades to the remaining fleet of Mirant boilers. Hunters Point Power Plant Unit 4 is undergoing upgrades that should allow it to operate within the bubble through 2003. The ongoing availability of these units in the next three years depends on the success of NOx reduction upgrades currently underway or planned in the next few years. Moreover, it is expected that significant upgrades to Hunters Point Power Plant Unit 4 and Potrero Unit 3 will be required if these plants are to continue to operate, particularly in 2005 and beyond. As stated earlier, most of the remaining generation in San Francisco and the Peninsula are combustion turbines (Potrero Power Plant Units 4, 5, and 6 and Hunters Point Unit 1) which are each only allowed to operate 877 hours per year.

Thus, in the short term, the availability of generating resources critical to reliability in San Francisco and the Peninsula is contingent upon successful NOx reduction projects either already underway or planned in the next few years. Furthermore, to maintain reliability in San Francisco and the Peninsula, it will be necessary in the coming three years to either 1) add clean new generation that can meet emission limitations, 2) invest in upgrading plants that are already beyond their expected life times, or 3) build significant additional transmission facilities beyond those already planned.

The unavailability of existing generating units in San Francisco (units unavailable due to breakdowns or curtailed due to NOx limitations) is increasingly limiting the operational flexibility of the grid and compromising reliability. Because Unit 7 would be a new plant and would operate well within local NOx emission limitations, Unit 7 is expected to provide greater reliability and flexibility for operators of the Cal-ISO controlled grid. For example, under partial load conditions Unit 7's additional generation will provide greater flexibility within the Bay Area for the Cal-ISO, PG&E, and generation owners to schedule maintenance of transmission facilities and generating units. Similarly, during periods of high demand Unit 7 will provide critically-needed margin and flexibility to manage adverse and unexpected conditions for example, the unexpected high temperatures combined with unforeseen extended maintenance outages that were experienced in the Bay Area on June 14, 2000.

### ***RELIABILITY MUST RUN (RMR) COSTS***

The Cal-ISO is currently undertaking a project for Comprehensive Market Reform (CMR). As part of this project, the ISO is looking at new ways to procure the local area reliability services that it currently procures via Reliability Must Run (RMR) contracts. Until the method for procuring local area reliability services is determined it is impossible to state with certainty the impact of Unit 7 on RMR costs.

If the Cal-ISO were to maintain its current practice of executing RMR contracts with generators in specific areas with both market power problems and reliability concerns, the addition of Unit 7 would likely result in reduced RMR variable costs, although the impact on RMR fixed costs is uncertain. Currently, the RMR owners are paid, through the RMR contract, the difference between their variable operating costs and market prices, and some proportion of their fixed costs depending on the type of RMR contract selected by the unit owner. Because Unit 7 would be a new, efficient plant, it is likely that even if all the units at the Potrero Power Plant continue to be needed for RMR, total RMR variable cost payments would likely be reduced by the presence of Unit 7. The impact of Unit 7 on fixed cost payments under the RMR contracts is more difficult to predict. This is because the form of RMR contract that will be selected by a unit owner from time to time is uncertain, and because the proportion of fixed costs subject to payment under the RMR contract for the form of RMR contract most likely to be selected by Mirant for Unit 7 is currently being litigated before the Federal Energy Regulatory Commission.

## **ABILITY TO BE INTEGRATED INTO EXISTING AND PLANNED SYSTEM**

Based on the Detailed Facilities Study from PG&E, Unit 7 can be connected to the Cal-ISO controlled grid with the projects identified in the current transmission plan<sup>9</sup> and several system protection schemes. There is no evidence that any of the additional facilities planned to be added to the Cal-ISO controlled grid through 2005 will need to be modified because of the addition of Unit 7 (other than the accelerated schedule required on some projects to avoid emergency overloads increased by the project).

## **CONCLUSIONS**

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1. Unit 7 will displace significant transmission upgrades that would be required to maintain reliability if Hunters Point Power Plant is retired without the addition of generation in San Francisco. Unit 7 represents a significant source of real and reactive power to serve loads in the immediate San Francisco Peninsula Area; such resources substantially reduce the need to import power over already-stressed transmission facilities. Note that, if Hunters Point Power Plant is retired once Unit 7 is added, the addition of Unit 7 would not lead to the deferral of any currently planned transmission facilities, instead, Unit 7 offsets the need for *other additional* future transmission reinforcements (beyond those already in the transmission plan).
2. The addition of Unit 7 will substantially reduce transmission system losses. Over 20 years, the savings to ratepayers have a present value at between \$55 million and \$80 million. As well as reducing the cost of producing power in California, these loss savings would also contribute to a related decrease in the use of fossil fuels, water, and the production of air emissions by reducing the need for additional generation resources.
3. A primary benefit of the addition of Unit 7 is that it would add generation that is much more reliable than the generation that is currently in place in the San Francisco Peninsula.

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<sup>9</sup> In particular, the addition of a second Hunters Point – Potrero 115 kV underground cable (although driven in part by other needs) is a direct and necessary complement to the construction of Unit 7.

Because of their advanced ages, existing generating plants on San Francisco Peninsula are unreliable and it is uncertain how much longer they can continue to operate. Moreover, the units are either run-time limited or de-rated (in terms of maximum output) due to emission output limitations and will likely require further upgrades to remain in operation in coming years.

4. Unit 7's additional generation will provide greater flexibility within the Bay Area for the Cal-ISO, PG&E, and generation owners to schedule maintenance on transmission facilities and generating units. Also, during periods of high demand, Unit 7 will provide critically needed margin and the flexibility to manage adverse and unexpected conditions.
5. Unit 7 can be connected to the Cal-ISO controlled grid with the projects identified in the current transmission plan and several system protection schemes.

## REFERENCES

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PG&E (Pacific Gas & Electric), San Francisco/Peninsula Technical Study: Year 2004 Transmission System Thermal Analysis, November 1999.

CCSF (City and County of San Francisco). CCSF Ord. Final CCSF Ordinance of May 29, 2001. Submitted to California Energy Commission, June 12, 2001.

Mirant (Mirant Corp) System Impact/Facilities Study, Potrero Power Plant Unit 7 Project, supersedes draft dated June 29, 2001, September 2001.

**TABLE 2**  
**POTRERO 7 LOSS ANALYSIS-YEAR 2004**  
**Total Northern California System Losses / System Loss Reduction**

	SYSTEM PEAK LOSS PRE- PROJECT (MW)	SYSTEM PEAK LOSS WITH POTRERO 7 UNITS (MW)	SYSTEM PEAK LOSS REDUCTION (MW)	PROBABILITY OF THE REDISPATCH SCENAIRIO	EXPECTED PEAK LOSS REDUCTION (MW)	SYSTEM ANNUAL LOAD FACTOR	EQUIVALENT HOURS LOSS FACTOR	ANNUAL ENERGY SAVED (GWh)	PROBABLE ANNUAL ENERGY SAVED (GWh)	ADJUSTMENT FACTOR FOR REMOTE DISPATCH	EXPECTED ANNUAL ENERGY SAVED (GWh)
Base Dispatch, PG&E Assesment 2004 Summer peak, Swing= Morro Bay unit 4. Potrero 7 units are off line.	889.24										
Dispatch 1, Local Adjustment : Potrero 7= +615 MW, Duke Moss= -352 MW, Helms= - 263 MW		821.48	67.76	0.18	12.20	0.57	0.34	199.92	35.99	1.00	35.99
Dispatch 2, Local Adjustment : Potrero 7= +615 MW, Moss Landing= -615 MW		834.56	54.68	0.18	9.84	0.57	0.34	161.33	29.04	1.00	29.04
Dispatch 3, Local Adjustment: Potrero 7= +615 MW, La Paloma= -615 MW		831.25	57.99	0.18	10.44	0.57	0.34	171.10	30.80	1.00	30.80
Dispatch 4, Local Adjustment: Potrero 7= +615 MW, Pittsburg= -500 MW, Contra Costa= -115 MW		846.23	43.01	0.18	7.74	0.57	0.34	126.90	22.84	1.00	22.84
Dispatch 5, Local Adjustment: Potrero 7= +615 MW, Sutter= -525 MW, Riolinda= -90 MW		846.79	42.45	0.18	7.64	0.57	0.34	125.25	22.54	1.00	22.54
Dispatch 6, Remote Adjustment: Potrero 7= +615 MW, COI= -615 MW		787.57	101.67	0.10	10.17	0.57	0.34	299.97	30.00	0.50	15.00
Totals:				1.00	58.03				171.21		156.21
Average:			61.26					180.74			--

**NOTE: Calculations for expected MW Peak loss & Energy savings and related present value in dollars  
are illustrated in Appendix G-1**



## DEFINITION OF TERMS

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AAC	All Aluminum conductor.
ADR	Alternative Dispute Resolution
ANCILLARY SERVICES MARKET	The market for services other than scheduled energy that are required to maintain system reliability and meet WSCC/NERC operating criteria. Such services include spinning, non-spinning, replacement reserves, regulation (AGC), voltage control and black start capability.
AMPACITY	Current-carrying capacity, expressed in amperes, of a conductor at specified ambient conditions, at which damage to the conductor is nonexistent or deemed acceptable based on economic, safety, and reliability considerations.
AMPERE	The unit of measure of electric current; specifically, a measure of the rate of flow of electrons past a given point in an electric conductor such as a power line.
AVAILABLE TRANSMISSION CAPACITY (I.E., ATC)	Available Transmission Capacity in any hour is equal to Operational Transmission Capacity for that hour minus Existing Transmission Contracts for that same hour (ATC = OTC - ETC). (See the other definitions below).
Breaker	Circuit breaker - An automatic switch that stops the flow of electric current in a suddenly overloaded or otherwise abnormally stressed electric circuit.
Bundled Conductor	Two or more wires, connected in parallel through common switches, that act together to carry current in a single phase of an electric circuit.
Bus	Conductors that serve as a common connection for multiple transmission lines.

Cal-ISO	California Independent System Operator - The Cal-ISO is the FERC regulated control area operator of the Cal-ISO transmission grid. Its responsibilities include providing non-discriminatory access to the grid, managing congestion, maintaining the reliability and security of the grid, and providing billing and settlement services. The Cal-ISO has no affiliation with any market participant.
Cal-ISO Controlled Grid	The combined transmission assets of the Participating Transmission Owners (PTOs) that are collectively under the control of the Cal-ISO.
Cal-ISO Reliability Criteria	Reliability standards established by the NERC, WSCC, and the ISO, as amended from time to time, including any requirements of the NRC.
Cal-ISO Planning Process	Annual studies conducted by the PTO's and Cal-ISO in an open stakeholder process. These studies determine the future transmission reinforcements necessary to enable the ISO Controlled Grid to meet the ISO Reliability Criteria. The Cal-ISO Planning Process also includes studies of new resource connections and third party proposals for new additions to the ISO Controlled Grid.
Cal-ISO Tariff	Document filed with the appropriate regulatory authority (FERC) specifying lawful rates, charges, rules, and conditions under which the utilities provide services to parties. A tariff typically includes rate schedules, list of contracts, rules, and sample forms.
Capacitor	An electric device used to store charge temporarily, generally consisting of two metallic plates separated by a dielectric.
Cogeneration	The consecutive generation of thermal and electric or mechanical energy.



Conductor	The part of the transmission line (the wire) which carries the current.
Congestion	The condition that exists when market participants seek to dispatch in a pattern which would result in power flows that cannot be physically accommodated by the system. Although the system will not normally be operated in an overloaded condition, it may be described as congested based on requested/desired schedules.
Congestion Management	Congestion management is a Cal-ISO scheduling protocol that is used to resolve Congestion.
Contingency	Disconnection or separation, planned or forced, of one or more components from the electric system.
Day-Ahead Market	The forward market for the supply of electrical power at least 24 hours before delivery to Buyers and End-Use Customers.
Demand	Load plus any exports from an electric system.
Demand Forecast	An estimate of demand (electric load) over a designated period of time.
Dispatch	The operating control of an integrated electric system to: (i) assign specific generators and other sources of supply to effect the supply to meet the relevant area Demand taken as Load rises or falls; (ii) control operations and maintenance of high voltage lines, substations, and equipment, including administration of safety procedures; (iii) operate interconnections (iv) manage energy transactions with other interconnected Control Areas; and (v) curtail Demand.
$dV/dQ$	The partial derivative of the voltage at a bus with respect to the reactive injection at that

	bus. (See any elementary college calculus text for further discussion of partial derivatives.) The point at which $dV/dQ$ approaches infinity is defined as the point of voltage collapse.
Emergency Condition	The system condition when one or more system elements are forced (not scheduled) out of service.
Emergency Overload	Loading of a transmission system element above its Emergency Rating during an Emergency Condition.
Emergency Rating	A special rating established for short term use in the event of a forced line or transformer outage (e.g., an emergency). An emergency rating may be expressed as a percentage of the normal rating (e.g., 115 percent of normal) or as an elevated current rating. For example, the normal rating for a conductor may be 1000 amperes and the emergency rating may be 1100 amperes.
Excessive Voltage Deviation	A sudden change in voltage at any substation as a result of a Contingency that exceeds established allowable levels of change.
Existing Transmission Contract (i.e., ETC)	A contract for transmission services that was in place prior to the start of ISO operations.
Fault Duty	The maximum amount of short-circuit current which must be interrupted by a given circuit breaker.
FERC	Federal Energy Regulatory Commission
General Order 95	California Public Utilities Commission (CPUC) General Order which specifies transmission line clearance requirements.
Generation Outlet Line	Transmission facilities (circuit, transformer, circuit breaker, etc.) linking generation to the main grid.

Generation Tie	Transmission facilities (circuit, transformer, circuit breaker, etc.) linking generation to the main grid.
GENERATOR	A machine capable of converting mechanical energy into electrical energy.
Heat Rate	The amount of energy input to an electric generator required to obtain a given value of energy output. Usually expressed in terms of British Thermal Units per kilowatt hour (Btu/kWh).
Hour-Ahead Market	The electric power futures market that is established 1-hour before delivery to End-Use Customers.
Imbalance Energy	Energy not scheduled in advance that is required to meet energy imbalances in real-time. This energy is supplied by Participating Generators under the Cal-ISO's control, providing spinning and non-spinning reserves, replacement reserves, and regulation, and other generators able to respond to the Cal-ISO's request for more or less energy.
Interconnected System Reliability Kcmil or kcm	See Reliability.  One thousand circular mils. A unit of the conductor's cross sectional area which, when divided by 1,273, gives the area in square inches.
Kv	Kilovolt - A unit of potential difference, or voltage, between two conductors of a circuit, or between a conductor and the ground.
Load	The rate expressed in kilowatts, or megawatts, at which electric energy is delivered to or by a system, or part of a system to end use customers at a given instant or averaged over an designated interval of time. (Also see Demand.)
Load Factor	The average Load over a given period (e.g.,

	one year) divided by the peak Load in the period.
Loop	An electrical connection where a line is opened and a new substation is inserted into the opening. A looped configuration creates two lines, one from each of the original end points to the new substation. A looped configuration is more reliable than a tap configuration because the looped configuration provides two lines into the substation rather than just one in a tap configuration. Also, see Tap below.
Low Voltage	Voltage at any substation that is below the minimum acceptable level.
Marginal Unit	The Generator (or Load) that sets the market clearing price in the ISO's Ancillary Services Market (or the Power Exchange's energy market). The marginal unit is the Generator or Load that had the highest accepted bid for energy or Demand reduction.
MVAr	Megavar - One megavolt ampere reactive (a measure of reactive power). Reactive power demand is generally associated with motor loads and this demand must be supplied by generation units or static reactive sources in the system.
MVA	Megavolt ampere - A unit of apparent power: equal to the product of the line voltage in kilovolts, the current in amperes, and the square root of 3 divided by 1000.
MW	Megawatt - A unit of power equivalent to 1,341 horsepower.
NERC	North American Electric Reliability Council
Nominal Voltage	Also known as Normal Voltage. The voltage at which power can be delivered to loads without damage to customer equipment or violation of Cal-ISO Reliability Criteria when the system is under Normal Operation.

Normal Operation                      When all customers receive the power they are entitled to without interruption and at steady voltage, and no element of the transmission system is loaded beyond its continuous rating.

NRC    Nuclear Regulatory Commission

N-1 Contingency                      A forced outage of one system element (e.g., a transmission line or generator).

N-2 Contingency                      A forced outage of two system elements usually (but not exclusively) caused by one single event. Examples of an N-2 Contingency include loss of two transmission circuits on a single tower line or loss of two elements connected by a common circuit breaker due to the failure of that common breaker.

Operational Transfer Capability (i.e., OTC)                      The maximum amount of power which can be reliably transmitted over an electrical path in conjunction with the simultaneous reliable operation of all other paths. This limit is typically defined by seasonal operating studies, and should not be confused with a path rating. Also referred to as OTC.

Outlet                                      Transmission facilities (circuit, transformer, circuit breaker, etc.) linking generation to the main grid.

Participating Generator                      A generator that has signed an agreement with the Cal-ISO to abide by the rules and conditions specified in the Cal-ISO Tariff.

Participating Transmission Owner (i.e., PTO)                      A Participating Transmission Owner is an electric transmission owning company that has turned over operational control of some or all of their electric transmission facilities to the Cal-ISO. Currently, the three Participating Transmission Owners are PG&E, SCE, and SDG&E.

Path Rating                              The maximum amount of power which can

be reliably transmitted over an electrical path under the best set of conditions. Path ratings are defined and specified in the WSCC Path Rating Catalog.

PG&E

Pacific Gas & Electric Company

PG&E Interconnection Handbook

Detailed instructions to new customers (either load or generation) on how to interconnect to the PG&E electric system.

Post-Transient Voltage Deviation

The change in voltage from pre-contingency to post-contingency conditions once the system has had time to readjust.

Power Flow

A generic term used to describe the type, direction, and magnitude of actual or simulated electrical power flows on electrical systems.

Power Flow Analysis

A power flow analysis is a forward looking computer simulation of all major generation and transmission system facilities that identifies overloaded circuits, transformers and other equipment as well as system voltage levels under both Normal and Emergency Conditions.

Pump

A hydroelectric generator that acts as a motor and pumps water stored in a reservoir to a higher elevation.

Q/V Curve

A graphical representation of the voltage a given substation bus as a function of the reactive injection at that bus.

RAS

Remedial Action Scheme - An automatic control provision (e.g., trip a generation unit to mitigate a circuit overload).

Reactive Power	The portion of apparent power that does no work in an alternating current circuit but must be available to operate certain types of electrical equipment. Reactive Power is most commonly supplied by generators or by electrostatic equipment, such as shunt capacitors.
Reactive Margin	Reactive Power must be available at all load buses to prevent voltage collapse. Reactive margin is the amount of additional reactive load, usually measured in MVAR's, which may be added at a particular bus before the system experiences voltage collapse.
Reactor	An electric device used to store electric current temporarily, generally consisting of a coil of wire wound around a magnetic core.
Real Power	Real power is the work-producing component of apparent power and is required to operate any electrical equipment that performs energy conversion. Examples of this electrical equipment would be a heater, a lamp, or a motor. Real power is usually metered in units of kilowatt-hours (kWh).
Real-Time Market	The competitive generation market controlled and coordinated by the Cal-ISO for arranging real-time imbalance power.
Reconductor	The removal of old conductors on a transmission or distribution line followed by replacement of these conductors with new higher capacity conductors.
Reliability	The degree of performance of the elements of the bulk electric system that results in electricity being delivered to customers within accepted standards and in the amount desired. May be measured by the frequency, duration, and magnitude of adverse effects on the electric supply.
Reliability Criteria	Principals used to design, plan, operate, and

	assess the actual or projected reliability of an electric system.
Reliability Must-Run (i.e., RMR)	The minimum generation (number of units or MW output) required by the Cal-ISO to be on line to maintain system reliability in a local area.
SCE	Southern California Edison Company
SDG&E	San Diego Gas and Electric Company
Sensitivity Study	An analysis to determine the impact of varying one or more parameters on the results of the original analysis.
Series Capacitor	A static electrical device that is connected in-line with a transmission circuit that allows for higher power transfer capability by reducing the circuit's overall impedance.
Shunt Capacitor	A static electrical device that is connected between an electrical conductor and ground. A shunt capacitor normally will increase the voltage on a transmission circuit by providing reactive power to the electrical system.
Single Contingency	See N-1 Contingency.
Solid Dielectric Cable	Copper or aluminum conductors that are insulated by solid polyethylene type insulation and covered by a metallic shield and outer polyethylene jacket.
Source or Sink of Reactive Power	A source of Reactive Power is a device that injects reactive power into the power system (e.g., a Generator or a Capacitor). A sink of Reactive Power absorbs reactive power from the power system. Examples of reactive power sinks are shunt Reactors and motor loads.
Static Compensator	StatCom - a shunt connected power system device that includes Capacitors and Reactors controlled by solid state electronic



	devices as opposed to mechanically operated switches.
Substation	An assemblage of equipment that switches, changes, or regulates voltage in the electric transmission and distribution system.
Switchyard	A substation that is used as an outlet for one or more electric generators.
Switched Reactive Devices	A shunt Capacitor or shunt Reactor controlled by mechanically operated switches.
Switching Station	Similar to a substation, but there is only one voltage level.
Synchronous Condenser	A rotating mechanical device very similar to a Generator. The Synchronous Condenser has no mechanical power input and cannot produce Real Power. It can only produce or absorb Reactive Power.
System Reliability	See "Reliability".
Tap	An electrical connection where a new line is connected to an intermediate point on an existing transmission line and a new substation is connected to the end of the new line. A tapped configuration creates a single transmission circuit with more than two end points (for example, a "T"). A tapped configuration is less reliable than a looped configuration because a fault on any portion of the tapped circuit causes a complete loss of power to the new substation. Also, see Loop above.
Tap Changing Transformer	A Transformer that has the ability change the number of windings in service. By changing the number of windings in service (by moving to a different tap), the Tap Changing Transformer has the ability to maintain a nearly constant voltage at its output terminals even though the input voltage to the Transformer may vary.

Thermal Loading Capability	The current-carrying capacity (in Amperes) of a conductor at specified ambient conditions, at which damage to the conductor is non-existent or deemed acceptable based on economic, safety, and reliability considerations.
Thermal overload	A thermal overload occurs when electrical equipment is operated in excess of its current carrying capability. Overloads are generally given in percent. For example, a transmission line may be said to be loaded to 105 percent of its rating.
Thermal rating	See Ampacity.
Transformer	A device that changes the voltage of alternating current electricity.
Transformer Loading Capability	The current-carrying capacity (in Amperes) of a transformer at specified ambient conditions, at which damage to the transformer is non-existent or deemed acceptable based on economic, safety, and reliability considerations.
TSE	Transmission System Engineering.
Underbuild	A transmission or distribution configuration where a transmission or distribution circuit is attached to a transmission tower or pole below (under) the principle transmission line conductors.
Undercrossing	A transmission configuration where a transmission line crosses below the conductors of another transmission line, generally at 90 degrees.
VAr	One Volt ampere reactive. Also see the definition for MVAR.
Voltage	Electromotive force or potential difference.
Voltage Collapse	The point at which the reactive demand at a

substation bus exceeds the reactive supply at that bus. When the reactive demand is greater than the supply, the voltage at that point in the system will drop. Eventually, the voltage will drop to a point at which it is no longer possible to serve load at that bus.

#### Wheeling

A service provided by an entity, such as a utility, that owns transmission facilities whereby it receives electric energy into its system from one party and then uses its system to deliver that energy to a third party. The wheeling entity is usually paid a fee for this service.

#### WSCC

Western Systems Coordinating Council

## **Appendix 1**

### **Loss Analysis Calculations**

Local System Affects  
Value of loss Savings Calculations

	SYSTEM PEAK LOSS PRE- PROJECT (MW)	SYSTEM PEAK LOSS WITH POTRERO 7 UNITS (MW)	SY ST EM PE AK LO SS RE DU CTI ON (M W)	PROBABIL ITY OF THE REDISPAT CH SCENAIRO	EQUIVAL ENT PEAK LOSS REDUCTI ON (MW)	SYST EM ANN UAL LOAD FACT OR	EQUIVA LENT HOURS LOSS FACTO R	ANN UAL ENE RGY SAV ED (GW h)	PROB ABLE ANNU AL ENER GY SAVE D (GWh)	ADJUSTM ENT FACTOR FOR REMOTE DISPATCH	ADJUST ED PROBA BLE ANNUA L ENERG Y SAVED (GWh)
Base Dispatch, PG&E Assesment 2004 Summer peak, Swing= Morro Bay unit 4. Potrero 7 units are off line.	889.24										
Dispatch 1, Local Adjustment : Potrero 7= +615 MW, Duke Moss= -352 MW, Helms= - 263 MW		821.48	67.7 6	0.18	12.20	0.57	0.34	199.9 2	35.99	1.00	35.99
Dispatch 2, Local Adjustment : Potrero 7= +615 MW, Moss Landing= -615 MW		834.56	54.6 8	0.18	9.84	0.57	0.34	161.3 3	29.04	1.00	29.04
Dispatch 3, Local Adjustment: Potrero 7= +615 MW, La Paloma= -615 MW		831.25	57.9 9	0.18	10.44	0.57	0.34	171.1 0	30.80	1.00	30.80

Dispatch 4, Local Adjustment: Potrero 7= +615 MW, Pittsburg= -500 MW, Contra Costa= - 115 MW		846.23	43.0 1	0.18	7.74	0.57	0.34	126.9 0	22.84	1.00	22.84
Dispatch 5, Local Adjustment: Potrero 7= +615 MW, Sutter= - 525 MW, Riolinda= -90 MW		846.79	42.4 5	0.18	7.64	0.57	0.34	125.2 5	22.54	1.00	22.54
Dispatch 6, Remote Adjustment: Potrero 7= +615 MW, COI= -615 MW		787.57	101. 67	0.10	10.17	0.57	0.34	299.9 7	30.00	0.50	15.00
<b>Totals:</b>				<b>1.00</b>	<b>58.03</b>				<b>171.21</b>		<b>156.21</b>
<b>Average:</b>			<b>61.2 6</b>					<b>180.7 4</b>			<b>--</b>

Energy Savings (GWh)	<b>156.21</b>		
Cost of Energy (\$/MWh)	\$36.00	Gas Cost	Heat Rate
<b>Total Savings per year in 1000 (\$)</b>	<b>\$5,623.49</b>	(\$/MMBtu)	(Btu/ kWh )
Total Savings per year in million (\$)	\$5.62	<b>\$3.00</b>	<b>1200 0</b>
Number of Years	<b>20</b>		
Interest Rate (%)	<b>8%</b>		
Present Value of Savings in 1000 (\$)	\$55,212.25		
<b>Present Value of Savings in million (\$)</b>	<b>\$55.21</b>		

Energy Savings (GWh)	<b>156.21</b>		
Cost of Energy (\$/MWh)	\$52.00	Gas Cost	Heat Rate
<b>Tot. Savings per year in 1000 (\$)</b>	<b>\$8,122. 82</b>	(\$/MMBtu )	(Btu/k Wh)
Total Savings per year in million (\$)	\$8.12	<b>\$4.00</b>	<b>13000</b>
Number of Years	<b>20</b>		
Interest Rate (%)	<b>8%</b>		
Pr. Value of Savings in 1000 (\$)	\$79,75 1.03		
<b>Pr. Value of Savings in million</b>	<b>\$79.75</b>		

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# **ALTERNATIVES**

Testimony of Susan V. Lee

## **INTRODUCTION**

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The purpose of staff's alternatives analysis is to assess alternatives that could feasibly attain Project objectives and avoid or substantially lessen one or more of the significant effects of the project. The analysis also identifies and compares the impacts of the various alternatives but in less detail than the proposed project. The Energy Commission cannot require the plant to be moved to another location. And, if the applicant proposes a project at one of the alternative sites, a new Application for Certification must be filed on that site and a new review process would ensue.

This Final Staff Assessment (FSA) also considers different cooling technologies that could be used for the Potrero Unit 7 Project to reduce impacts on marine resources that result from once-through cooling and its associated structures. Hybrid cooling and dry cooling are evaluated in the Appendix to Biological Resources.

This section is organized as follows:

- Description of the process used for alternatives identification and screening.
- Discussion of potential alternative sites (those suggested by the Applicant, suggested by others, and those selected for detailed analysis in this assessment).
- Discussion of the No Project Alternative.
- Conclusions and Comparison of Alternatives.

Two appendices follow this FSA section:

- Appendix A presents the explanation of alternatives eliminated from detailed analysis.
- Appendix B presents environmental evaluation of the five selected alternative sites (by environmental issue area).

## **CONCLUSIONS**

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Potential unmitigable impacts of the proposed project have been identified in (1) biological resources (permanent loss of Bay habitat from construction of the cooling water intake, and impingement and entrainment from the intake of Bay water for the cooling water) and (2) cultural resources (demolition of two historic buildings).

All site alternatives analyzed would have similar potential to affect Bay habitat and aquatic species, since all could use Bay water for once through cooling. This impact could be eliminated for the proposed project or any alternative site with the use of dry or hybrid cooling as recommended by staff, although it is noted that these systems have their own environmental impacts (as evaluated in the Appendix to Biological Resources). Aside from the marine biological impacts, which could affect all sites similarly, two alternative sites (ALT-D and ALT-E) may have fewer or less severe



impacts overall. These sites are located in South San Francisco and on San Francisco International Airport property, respectively, and fail to offer comparable reliability benefits due to their location south of PG&E's Martin Substation.

Staff has determined that moving rather than demolishing the historic buildings (the Compressor and Meter Houses) would reduce the impacts of the proposed project to cultural resources to a less than significant level. Although staff has ascertained that it is feasible to move the buildings, at this time there is no surety that one or more nearby parcels of vacant land could be the permanent home for these buildings. If the structures cannot be moved to a new location, the demolition of the buildings will be an unmitigable significant impact. In the event that moving the buildings cannot occur, staff has proposed that the project owner provide and maintain an information kiosk. (See the Cultural Resources section of the FSA.) There are no historic buildings on any of the alternative sites.

Several parties commenting on the PSA suggested consideration of an alternative that would be made up of several components, rather than consideration of only a single gas-fired power plant. The components could include a combination of the following:

- Demand side management (including use of energy efficient technologies)
- New transmission lines
- Development of solar power within CCSF
- Distributed generation
- One or more smaller generating facilities or co-generation facilities.

While each of these components is technically feasible and could be implemented on some limited scale in CCSF, each also has environmental and regulatory obstacles to their implementation. The combination of these alternatives would have no fewer obstacles than they would individually. Furthermore, implementation of a combination of resources could not be accomplished by the applicant in this project, and would require regulatory changes or financial incentives that are not available in today's market.

Staff also believes that, overall, the No Project Alternative is not superior to the proposed project. The No Project scenario would likely delay the closure of the Hunters Point Power Plant and would maintain reliance on Potrero Units 3 through 6, which are older and have relatively higher emissions. The No Project Alternative would also result in reduced reliability for San Francisco's electrical supply, and would eliminate local transmission system benefits provided by the Unit 7 project.

## **APPROACH**

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The Energy Commission is the permitting agency and "lead agency" for large thermal power plants. It provides an environmental assessment of proposed projects pursuant to a regulatory program certified by the Secretary of Resources pursuant to the California Environmental Quality Act (CEQA). The Commission's certified regulatory

program is exempt from the requirement that it prepare an Environmental Impact Report (EIR). However, its environmental analysis must meet many basic CEQA requirements. When it prepares its analysis of project alternatives, staff follows the basic tenets of the CEQA Guidelines in the development of its analysis.

This alternatives analysis uses the following approach, based on guidance in the CEQA Deskbook (1999):

1. Describe the project objectives.
2. Identify potential significant environmental impacts of the project.
3. Consider a broad range of alternatives, including the No Project Alternative, and select a reasonable range of alternatives that:
  - a. Avoid or substantially lessen one or more of the potential significant effects of the project; and
  - b. Feasibly meet most of the basic objectives of the project.
4. If any alternatives are deemed infeasible, explain why (see Appendix A).
5. Evaluate the environmental impacts of each feasible alternative (see Appendix B).
6. Compare the feasible alternatives to the proposed project in regard to the environmental impacts that each would cause (see Alternatives Table 2).
7. If the environmentally superior alternative is the No Project Alternative, identify an environmentally superior alternative among the other alternatives.

## **BASIC OBJECTIVES OF THE PROJECT**

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The Application for Certification (AFC) does not specifically define project objectives. The following objectives have been defined by staff based on information in the AFC:

1. Construction and operation of a merchant power plant in the San Francisco area that supplies reliable and environmentally sound electrical energy in the restructured power market;
2. To provide electrical supply reliability and power quality benefits to San Francisco and the San Francisco Bay region;
3. To be on-line by summer peak of 2004, or as soon as possible thereafter;
4. To provide the electric reliability conditions that will support the goal of closure of the Hunters Point Power Plant (HPPP).

While not a specific objective of the project, staff's analysis in the Local System Effects section also shows that a power plant would result in significant benefits in the form of reduced losses on the electric transmission system on the San Francisco peninsula.

## **SAN FRANCISCO'S ELECTRICITY DEMAND AND SUPPLY**

Unique circumstances surround power generation and supply to the San Francisco Peninsula. Because the peninsula is geographically isolated from the rest of the state except from the south, there are no transmission lines entering the City and County of

San Francisco (CCSF) from any direction except the south<sup>1</sup>. The major transmission lines serving the CCSF are closely spaced along the Highway 101 corridor, and they parallel the San Andreas fault (at a distance of 2 to 5 miles east of the fault). These two facts place these lines at risk, and have been of major concern to transmission planners over the years, because a major accident or a large earthquake could destroy all of the transmission into the city simultaneously<sup>2</sup>.

According to the California Independent System Operator (Cal-ISO)<sup>3</sup> (CAISO 2000), the electricity demand in the CCSF grew from about 850 MW in the early 1990's to about 900 MW throughout the late 1990's, and to 945 MW in 2000. Based on PG&E's 2001 Transmission Assessment Report (PG&E, 2001c), demand is expected to be about 1061 MW in 2005 (this is almost 100 MW lower than the growth prediction made in 2000). On top of the CCSF demand, the ISO report anticipated load in the Peninsula Corridor (the Burlingame, Millbrae, and SF Airport areas) would grow from 280 MW in 2000 to 317 MW in 2009. Therefore, total CCSF plus Peninsula load would be 1400 MW in the 2005-2009 time frame, with growth estimated to be at 2.4% per year.

There are currently two power plants in the CCSF: the Potrero Power Plant (currently operating with Units 3 through 6 at 362 MW) and the Hunters Point Power Plant (HPPP), owned by PG&E and currently operating with Units 1 and 4 only at about 215 MW. Current total CCSF generation is therefore about 578 MW of which 371 MW are "peaker" facilities that are restricted by air quality requirements to running only 10% (or fewer) of the hours in a year. The CCSF and PG&E have agreed that HPPP will be closed when replacement generation is developed within the CCSF; however, the ultimate decisionmaker on HPPP closure is the Cal-ISO.

Based on local current generation (578 MW) and anticipated demand (1400 MW in 2005), there is an in-City generation shortfall of about 800 MW.

## **NOVEMBER 2001 BALLOT MEASURES**

On November 7, 2001, the City and County of San Francisco had several energy-related propositions on the ballot. Two propositions calling for creation of a Municipal Utility District (Measures F and I) failed in very close votes. In final election results, Measure F lost by 533 votes, with 64,272 in favor of the measure and 64,805 against it. Proposition I lost by 4,361 votes, with 60,107 in favor and 64,468 against (AP, 2001). Proposition I would have created an independent municipal utility district to provide power to about 365,000 local customers in San Francisco and Brisbane. Measure F would have expanded the city's Public Utilities Commission into a department of water

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<sup>1</sup> A transmission line that would cross the San Francisco Bay from Alameda County has been studied many times over the years, but there are serious environmental and technological concerns about this route. This issue is addressed in more detail in the section on the No Project Alternative and the section on Transmission Alternatives.

<sup>2</sup> The December 8, 1998, power disruption caused by human error at PG&E's San Mateo Substation caused a blackout in most of the CCSF and the loss of 1,200 MW of load. This event reinforced the Cal-ISO's and PG&E's determination of the need for additional generation in the CCSF and for increased transmission reliability.

<sup>3</sup> The California Independent System Operator uses the abbreviation "Cal-ISO." Energy Commission staff follows this convention except when citing references, when it uses "CAISO."

and power, allowing an elected board to buy the existing electrical infrastructure currently owned by PG&E.

San Francisco voters approved two other propositions related to solar or renewable power. Those propositions are:

- **Proposition B**, which allows the city to issue a \$100 million revenue bond to finance solar projects for city- and county-owned buildings and capture wind power elsewhere in the San Francisco Bay area, won with 73 percent of the vote in November election. Implementation of this measure is underway, under the direction of the San Francisco Department of the Environment and the San Francisco Public Utilities Commission.
- The first project to be pursued under Proposition B is presented in a Request for Proposals for installation of solar panels on San Francisco's convention center (Moscone Center). This project would cost about \$700,000 and would generate between 300 and 500 kilowatts, depending on the technology selected.
- **Proposition H**, which allows city supervisors to issue future bonds for renewable energy projects without voter approval, received 55 percent support. As a result of the passage of this proposition, San Francisco's Charter (Section 9.107, Revenue Bonds) has been amended to state that voter approval is not required for revenue bonds "Issued to finance or refinance the acquisition, construction, equipping, improvement or rehabilitation of equipment or facilities for renewable energy and energy conservation."

## **MAXWELL ORDINANCE**

The City is preparing a citywide Energy Resource Plan as required by an ordinance developed by Supervisor Maxwell, known as the Maxwell Ordinance (SF Ordinance 124-01, May 21, 2002). The ordinance requires the CCSF to adopt plans "to implement all practical transmission, conservation, efficiency, and renewable alternatives to fossil fuel generation in the City and County of San Francisco." While the Ordinance required these plans to be submitted to the Board of Supervisors by January 1, 2002, the plan is still being developed. A draft plan is expected to be released by the CCSF in February 2002.

## **POTENTIAL SIGNIFICANT ENVIRONMENTAL IMPACTS OF THE PROPOSED PROJECT**

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In order to eliminate potential impacts, the alternatives screening process has focused on identification of sites that are (1) located farther from residential areas than the proposed site and/or (2) have different intake and outfall locations. It should be noted that, as addressed in an appendix to the Biological Resources section, the proposed project or any alternative site could be constructed with different cooling technologies that would reduce impacts on biological resources that could result from once-through cooling with Bay intake and outfall.

In this FSA, staff identifies that the Unit 7 Project has the potential to cause significant impacts to biological and cultural resources. The following summarizes those

conclusions. Staff's detailed assessment of the expected environmental consequences of the proposed project is discussed in the individual sections of the FSA.

## **BIOLOGICAL RESOURCES**

Potential for permanent loss of Bay habitat from construction of the cooling water intake, and impingement and entrainment from the intake of Bay water for the cooling water. Although it may be possible, at least in theory, to mitigate for these biological impacts, no such mitigation has been proposed or identified by the applicant. Based on analysis presented in the appendix to the Biological Resources section, staff has recommended that the project be redesigned to replace the once-through cooling system with a dry cooling or hybrid cooling system. Such a change would require further analysis by staff to fully evaluate potential impacts, but would eliminate any impacts to aquatic biological resources.

## **CULTURAL RESOURCES**

The project as proposed would result in demolition of historic buildings on the project site, which staff and the Applicant agree would be a significant impact to cultural resources. Staff has determined that moving, rather than demolishing the historic buildings (the Compressor and Meter Houses) would reduce the impacts to cultural resources to a less than significant level. Although staff has ascertained that it is feasible to move the buildings, at this time there is no surety that one or more nearby parcels of vacant land could be the permanent home for these buildings. Staff will explore the possible use of the nearby vacant parcels for relocation of the buildings in an attempt to provide this surety at the evidentiary hearing. Staff has proposed a condition of certification that would require moving the structures to a new location, and will recommend at the evidentiary hearings whether this condition should be imposed. If the buildings must be demolished because no suitable location can be found, the demolition of the buildings will be an unmitigable significant impact. In the event that moving the buildings cannot occur, staff has proposed that the project owner provide and maintain an information kiosk. (See the Cultural Resources section of the FSA.)

## **ALTERNATIVES IDENTIFIED AND CONSIDERED**

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Staff identified and considered a broad range of potential alternatives to the proposed project in selecting those that qualified for detailed evaluation. The alternatives identified and considered were:

- No Project Alternative
- Alternative Sites

Alternatives to the 115 kV transmission line proposed to connect the project to the Hunters Point Substation are considered in the Transmission System Evaluation section of this FSA. Other alternatives that were eliminated from detailed consideration are addressed in Alternatives Appendix A:

- Transmission Alternatives
- Technology Alternatives

- Demand Side Management
- Distributed Generation
- Renewable Resources (solar, wind, biomass, hydropower, geothermal)
- Integrated Resources Alternative.

## **IDENTIFICATION AND SCREENING OF ALTERNATIVES**

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Staff used a two-stage process to select alternatives for analysis: first a reasonable range of alternatives was identified and then these alternatives were screened to select those that qualified for detailed evaluation. The author considered alternatives to the project that were identified by several sources, including the applicant, members of the public, and other Energy Commission staff.

Alternatives Table 1 on the following page lists all alternatives identified in this analysis, and states whether they were considered for detailed evaluation. At the end of this section, an explanation is presented describing the reason each alternative not considered in detail was eliminated.

**Alternatives Table 1**  
**Alternatives, Whether They Qualified for More Detailed Evaluation**

Alternative	Qualify?	If Not, Why Not?
<b>TECHNOLOGY ALTERNATIVES</b>		
Demand Side Management	No	<ul style="list-style-type: none"> <li>• Already factored into electrical system planning</li> </ul>
Distributed Generation	No	<ul style="list-style-type: none"> <li>• Technological, market, and regulatory barriers</li> <li>• Some types are infeasible</li> <li>• Some types could cause significant environmental impacts</li> <li>• Inability of applicant to effectuate</li> <li>• Timeliness</li> <li>• Not consistent with project objectives</li> </ul>
Renewable Resources	No	<ul style="list-style-type: none"> <li>• Feasibility</li> <li>• Availability</li> <li>• Environmental impacts</li> <li>• Not consistent with project objectives</li> </ul>
Integrated Resource Alternative	No	<ul style="list-style-type: none"> <li>• Feasibility and reliability concerns</li> </ul>
<b>ALTERNATIVE SITES</b>		
<b>Applicant's Alternative Sites</b>		
Cargo Way Site	Yes	<ul style="list-style-type: none"> <li>• Considered in this Staff Assessment as ALT-A</li> </ul>
Western Pacific Site	No	<ul style="list-style-type: none"> <li>• No environmental benefit; site not available</li> </ul>
<b>Alternative Sites Identified by Others</b>		
Smaller Sites	No	<ul style="list-style-type: none"> <li>• Insufficient generation capacity; potentially greater impacts</li> </ul>
SF Airport Area	Yes	<ul style="list-style-type: none"> <li>• Considered in this Staff Assessment as ALT-D and ALT-E</li> </ul>
<b>Alternative Sites Considered in the San Francisco Energy Project (SFEP) FSA (94-AFC-1)</b>		
Innes Avenue	No	<ul style="list-style-type: none"> <li>• No environmental benefit</li> </ul>
City Asphalt Plant	No	<ul style="list-style-type: none"> <li>• Too small for 540 MW</li> </ul>
SF Thermal Plant	No	<ul style="list-style-type: none"> <li>• Too small for 540 MW</li> </ul>
Hunters Point Power Plant	No	<ul style="list-style-type: none"> <li>• No environmental benefit</li> </ul>
China Basin Stadium Site	No	<ul style="list-style-type: none"> <li>• Unavailable due to Mission Bay development underway</li> </ul>
Mission Bay Development	No	<ul style="list-style-type: none"> <li>• Unavailable due to Mission Bay development underway</li> </ul>
Rail Yard South of China Basin	No	<ul style="list-style-type: none"> <li>• Unavailable due to Mission Bay development underway</li> </ul>
Cow Palace, Daly City	No	<ul style="list-style-type: none"> <li>• No environmental benefit (residential developments now surround available land)</li> </ul>
Treasure Island	No	<ul style="list-style-type: none"> <li>• Inadequate infrastructure (transmission lines, natural gas) and geotechnical concerns related to building on fill</li> </ul>
Hunters Point Naval Shipyard	No	<ul style="list-style-type: none"> <li>• Development plans underway for residential and other uses</li> </ul>
PG&E's Martin Substation, Daly City	No	<ul style="list-style-type: none"> <li>• Inadequate land available</li> </ul>
Tuntex Site	Yes	<ul style="list-style-type: none"> <li>• Considered herein as ALT-C</li> </ul>
<b>Alternative Sites Identified by Staff</b>		
ALT-B (Gilman Avenue, SF)	Yes	<ul style="list-style-type: none"> <li>• Considered herein</li> </ul>
ALT-D (Jamie Court, South SF)	Yes	<ul style="list-style-type: none"> <li>• Considered herein</li> </ul>
ALT-E (United Site at SFO)	Yes	<ul style="list-style-type: none"> <li>• Considered herein (site of inactive Golden Gate Power Plant, 01-AFC-3)</li> </ul>
3Com Park Area: Carroll Avenue	No	<ul style="list-style-type: none"> <li>• No environmental advantage</li> </ul>
South San Francisco: Belle Air Road	No	<ul style="list-style-type: none"> <li>• Inadequate land available</li> </ul>
3Com Park, San Francisco	No	<ul style="list-style-type: none"> <li>• Timing of availability uncertain</li> </ul>

## **EVALUATION OF ALTERNATIVE SITES**

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Alternative sites for this project were restricted to the San Francisco Peninsula, and only as far south as PG&E's San Mateo Substation. The Cal-ISO determined this range of acceptable power plant sites as the locations in which the required reliability benefits could be gained. Because improving electric power reliability for San Francisco is a key project objective, no alternative sites east of the San Francisco Bay or south of San Mateo were considered.

Most of the alternative sites are located near or adjacent to the San Francisco Bay. The use of once-through cooling at these locations would have similar impacts to marine biological resources as the proposed project. There are few industrial locations on the San Francisco Peninsula that are not along the bay margin. As discussed in the Appendix to Biological Resources, other cooling alternatives are available for all sites, including dry cooling, which would reduce the impacts on the marine environment.

### **ALTERNATIVE SITES IDENTIFIED BY THE APPLICANT**

In the AFC (SECAL, 2000a; AFC page 9-8) the applicant identified and evaluated two alternative sites for the proposed power plant: the Cargo Way Site and the Western Pacific Site (see **Alternatives Table 1**). Staff has evaluated these two alternative sites. The Western Pacific Site is addressed below in the subsection discussing infeasible alternatives. The Cargo Way Site is addressed in the subsection that evaluates identified feasible alternative sites (see below). The AFC also discussed the feasibility of Mirant's other facilities in the Bay Area (the existing Pittsburg and Contra Costa Power Plants), as well as the No Project Alternative, transmission system alternatives, transmission interconnection alternatives, alternative generation technologies and configurations, alternative fuels, and alternative cooling system/water supplies. The AFC also presented a summary of the alternative sites evaluated in the San Francisco Energy Project proceeding (94-AFC-1).

### **ALTERNATIVE SITES IDENTIFIED BY OTHERS**

An Energy Commission public workshop on alternatives was held on January 22, 2001, to describe the status of the alternative site evaluation process and request input from the public. No specific sites were suggested in that forum.

Energy Commission staff met with staff of the City and County of San Francisco (CCSF) to discuss the alternatives process and potential sites. CCSF staff suggested that this analysis consider (a) smaller power projects that would require less land, and (b) sites close to San Francisco International Airport. Two sites near the airport are evaluated herein (ALT-D and ALT-E). Two smaller sites were considered but eliminated (rationale for elimination is presented in Alternatives Appendix A).

### **ALTERNATIVE SITES IDENTIFIED BY STAFF**

Staff identified six potential alternative sites, three of which were carried forward for detailed analysis. One site is at the north end of the San Francisco International Airport on airport land adjacent to the United Airlines maintenance facility (ALT-E). Two sites are immediately north of 3Com Park: the Gilman Avenue (ALT-B) and Carroll Avenue sites are both vacant and used for event parking. Two sites are within the City of South



San Francisco: one south of Jamie Court in an industrial area (ALT-D) and one adjacent to the City's sewage treatment plant (eliminated from consideration).

### **Staff's Alternative Site Screening Criteria**

Staff considered the following criteria in identifying potential alternative sites.

1. Avoid or substantially lessen one or more of the potential significant effects of the project; and
2. Satisfy the following criteria:
  - a. Location. As described above, in order to meet reliability objectives, the site must be located on the San Francisco Peninsula north of PG&E's San Mateo Substation.
  - b. Site suitability. Approximately 10 acres are required for the site. The shape of the site also affects its suitability.
  - c. Availability of infrastructure. The site should be within a reasonable distance of the electric transmission system, natural gas supply, and water supply.
3. Availability of the site.
4. Not located adjacent to moderate or high density residential areas or to sensitive receptors (such as schools and hospitals) or to recreation areas.

Staff began by identifying an initial study region. The region consisted of the San Francisco Peninsula, from the northernmost point to the PG&E San Mateo Substation at the south end of the study region. This region was defined based on input from the Cal-ISO defining the area within which a power plant would be considered to provide reliability benefits to the City of San Francisco. The Cal-ISO identified two areas of consideration for alternatives: the highest priority area for alternatives is north of PG&E's Martin Substation (in Daly City), and the second priority for alternatives would be north of PG&E's San Mateo Substation but south of the Martin Substation (this substation is adjacent to ALT-C and can be seen on **Alternatives Figure 4**).

### **ALTERNATIVES EVALUATED IN DETAIL**

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Staff identified five sites that satisfied the screening criteria defined above and therefore qualified for more detailed evaluation as alternatives to the proposed site. **Alternatives Figure 1** shows all five sites and the proposed project site, and **Alternatives Figures 2 through 5** present more detailed maps of each of the five alternative locations. The sites, designated ALT-A through ALT-E, are described as follows.

**ALTERNATIVES Figure 1**

**Map of the Five Alternative Sites that Qualified for Detailed Evaluation**

**[This map shows the proposed project and Alts-A through –E**

**ALTERNATIVES Figure 2**  
**Map of ALT-A**

**ALTERNATIVES Figure 3**  
**Map of ALT-B**

**ALTERNATIVES Figure 4**  
**Map of ALT-C**

**ALTERNATIVES Figure 5**  
**Map of ALT-D and ALT-E**

## **ALT-A, CARGO WAY, SAN FRANCISCO**

This site was approved by the Energy Commission as the site for the San Francisco Energy Corporation (SFEC) power plant in 1995. However, the project proponent was unable to secure a lease for the project from the Port Commission, so it was not constructed.

### **Site Description**

This site is on Port of San Francisco land (property SWL 344.1) at the southwest corner of Cargo Way and Amador Street. This site is an alternative presented in Mirant's AFC. The Cargo Way site is surrounded by industrial land uses, and the closest residences are approximately five to six blocks to the south. This distance is farther from residences than is the proposed Potrero site.

According to the City and County of San Francisco, this site is zoned M-2, Heavy Industrial, with a maximum structure height restriction of 40 feet. This site is reserved for maritime support uses. The Seaport Plan does not consider the power plants to be maritime uses. However, the Port of San Francisco in its Waterfront Land Use Plan has declared this site as surplus to maritime needs and recommends changing its designation to allow specified non-maritime uses. On January 10, 1995, the Seaport Plan Advisory Committee issued a set of proposed amendments to the Seaport Plan that would result in the removal of 22 acres from the maritime use restrictions established in the Seaport Plan. This acreage is enough to accommodate power-generating facilities without adversely impacting existing and future maritime uses in this area (SFECSA, June 1995).

### **Infrastructure Availability**

The Cargo Way site is about 2,500 feet from the San Francisco Bay but only 500 feet from Islais Creek, so cooling water for once-through cooling could be brought to the site via a pipeline or intake structure. A 115kV transmission line would have to be constructed to the Hunters Point Substation (approximately one mile to the southeast). Natural gas is available in proximity to the site.

### **Reliability**

This site is located north of Martin Substation, in the area considered by the Cal-ISO to have greatest reliability benefits for serving the CCSF.

## **ALT-B, GILMAN AVENUE, 3COM PARK AREA, SAN FRANCISCO**

### **Site Description**

The site is located immediately east of Arelious Walker Drive and north of Gilman Avenue. This site is currently used as a parking lot for events at 3Com Park. However, the future use of 3Com Park for major events (football) is in question, and closure of the Park would eliminate the need for use of this site for parking. East of this site is undeveloped park property owned by the State of California. The CCSF's General Plan identifies this as a potential future park.

This site is located in a sub area of the South Bayshore Area Plan of the San Francisco Master Plan. This sub area is depicted by the Area Plan as strategic in improving land use quality and housing growth and to stimulate long term economic and employment growth in the perimeter of the Candlestick Point State Recreation Area. The General Plan identifies this site as a potential future park. This site and most of the surrounding lands are currently zoned M-1 (Light Industrial). However, with the Candlestick Point State Recreation Area and the existing residential neighborhood as the primary adjacent uses, this area is becoming less suitable for industry and more suitable in the long term for housing or live-work use (South Bayshore Area Plan, July 1995).

According to the South Bayshore Area Plan, the M-1 zoning class prohibits manufacture, refining, distillation of abrasives, acid, alcohol, asbestos and similar hazardous chemicals as well as other heavy industries. This prohibition should be maintained to assure that these areas are adequately protected and insulated from the adverse impacts of toxic industries (South Bayshore Area Plan, July 1995).

### **Infrastructure Availability**

This site is located just over 1,000 feet south of South Basin and about 2,400 feet from the Bay itself. Therefore, it is assumed that a power plant at this location could also utilize cooling water from the San Francisco Bay. Alternatively, either hybrid or dry cooling could be used at the site. The 115 kV transmission system is less than one mile to the west, and a transmission interconnection to that line would be required. It is assumed that this connection would be underground, following a route generally due west.

### **Reliability**

This site is in the area considered by the Cal-ISO to be most reliable (i.e., north of Martin Substation).

## **ALT-C, TUNTEX SITE, BRISBANE**

### **Site Description**

This site is located within a large (100-acre) area of vacant land that was historically used as a rail yard. The alternative site is located immediately northeast of the intersection of Bayshore Boulevard and Geneva Boulevard, just east of PG&E's Martin Substation. The site would extend north of Geneva Avenue (due to the more severe contamination issues south of Geneva). The portion of the site located north of Geneva has undergone remediation for heavy metals contamination. The site portion south of Geneva is still contaminated with hydrocarbons. The Brisbane General Plan calls for this site to be used for "Trade Commercial Planned Development" (hotels, research, and development, etc.).

This site is zoned C-1, which allows mixed-use and commercial development. The site's current zoning reflects a zone change to convert the site's historic M-1 industrial designation. The Brisbane General Plan designates the area as Trade Commercial Planned Development (TC/PD). Currently, general development guidelines do not support the location of heavy industrial uses in the area, or at this site. Therefore, a



General Plan amendment and a zone change would be required to accommodate the siting of power generating facilities at this site.

### **Infrastructure Availability**

This site is about 4,000 feet west of the Bay, so cooling water for once-through cooling would have to be brought from the Bay in a pipeline (difficult and expensive to construct, below the 101 Freeway and railroad tracks). More likely, cooling at this site would use reclaimed water purchased from the CCSF's Southeast Water Treatment facility (located approximately 3 miles north of this site). Alternatively, hybrid or dry cooling could be used. The transmission interconnection would be very short, requiring only a connection across Bayshore Boulevard into the existing PG&E Martin Substation.

### **Reliability**

The proximity of this site to Martin Substation puts it within the Cal-ISO's area of greatest reliability for a power plant.

## **ALT-D, EAST JAMIE COURT, SOUTH SAN FRANCISCO**

This alternative site was considered for a power plant by AES Corporation in 1998-1999, but an AFC was not submitted to the Energy Commission at that time. The "South City" project is still listed on the Energy Commission's "anticipated projects list" but with no expected submittal date.

According to Steve Carlson, planner with the City of South San Francisco, the Jamie Court site is one of three potential sites in the South San Francisco area that have been under consideration for a power plant at various times during the past two years. Besides Jamie Court, the other sites were: (1) adjacent to the water treatment plant (eliminated from this analysis due to its small size), and (2) at the San Francisco Airport (see ALT-E below). At the time of publication of this FSA, no applications for new power plants in the South San Francisco or Airport area have been submitted to the Energy Commission, and the City of South San Francisco is not aware of potential applicants preparing new AFCs (Carlson, 2002).

### **Site Description**

This site is south of East Jamie Court and east of Haskins Way, south of E. Grand Avenue, adjacent to the City's recycling facility, which is due north of San Francisco International Airport. There are about 20 vacant acres at this location.

According to the South San Francisco General Plan this site is within an area designated as Mixed Industrial and Coastal Commercial with a 161-foot height limit for structures according to the General Plan's Airport Related Height Limitations. The Mixed Industrial designation is intended to provide and protect industrial lands for a wide range of manufacturing, industrial processing, general service, warehousing, storage and distribution, and service commercial uses. Industries producing substantial amounts of hazardous waste or odor and other pollutants are not permitted under the Mixed Industrial designation. The Coastal Commercial designation allows for a variety of office, limited retail and other low-scale commercial uses with a coastal orientation (South San Francisco General Plan, 1999).

## **Infrastructure Availability**

The site is located directly on the San Francisco Bay (the San Bruno Channel passes adjacent to this shoreline), so has access to cooling water. The transmission system is approximately 1.3 miles to the west, so construction of an interconnection would be required.

## **Reliability**

This site is located north of PG&E's San Mateo Substation, and south of the Martin Substation. It is considered by the Cal-ISO to provide less reliability than sites north of Martin Substation because it would require use of transmission lines into the CCSF and would not provide in-city generation (which would provide the greatest reliability for the CCSF).

## **ALT-E, UNITED GOLDEN GATE SITE, SF AIRPORT**

This site has been the subject of two recent Energy Commission proceedings:

- It was presented to the Energy Commission in an AFC (01-AFC-3) submitted in March 2001 for a proposed 570 MW power plant, adjacent to the existing United Cogeneration Inc. facility. However, the application is currently on hold because the applicant has not obtained site control.
- A 51 MW peaker power plant was approved for this site by the Energy Commission in March 2001. However, this project is also on hold due to unresolved land lease contract issues.

While these two projects have encountered difficulties with site control, the site is on the San Francisco Airport property, and therefore is within the jurisdiction of the CCSF. Given that the CCSF has supported consideration of alternatives located at the airport, this site has been retained for analysis.

## **Site Description**

The site is south of North Access Road and east of United's existing 49 MW cogeneration plant. A San Mateo County homeless shelter is located north of North Access Road. The next nearest residences are approximately 10 blocks to the north and west, west of Highway 101.

This site is designated Mixed Industrial by the South San Francisco General Plan with a 161-foot height limit for structures according to the General Plan's Airport Related Height Limitations. This designation is intended to provide and protect industrial lands for a wide range of manufacturing, industrial processing, general service, warehousing, storage and distribution, and service commercial uses (South San Francisco General Plan, 1999). Industries producing substantial amounts of hazardous waste or odor and other pollutants are not permitted under the Mixed Industrial designation.

## **Infrastructure Availability**

There is an existing powerline connecting the cogeneration unit with the transmission system that is located about 0.75 miles west of the site, but this line would need to be upgraded to carry the additional power generated by a plant of over 500 MW. The site is located immediately south of the San Bruno Slough, a tidal marsh area of the San

Francisco Bay, so cooling water from the Bay is assumed to be available within 0.6 miles.

### **Reliability**

This site is located north of PG&E's San Mateo Substation, and south of the Martin Substation. It is considered by the Cal-ISO to provide less reliability than sites north of Martin Substation because it would require use of transmission lines into the CCSF and would not provide in-city generation (which would provide the greatest reliability for the CCSF).

## **EVALUATION OF ALTERNATIVE SITES**

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The five alternative sites are evaluated in the areas listed below. These analyses are presented in Alternatives Appendix B.

- Air Quality
- Biological Resources
- Cultural Resources
- Geological/Paleontological Resources
- Land Use
- Noise
- Public Health
- Socioeconomics
- Soil and Water Resources
- Traffic and Transportation
- Visual Resources
- Waste Management

## **SUMMARY OF IMPACTS OF ALTERNATIVE SITES**

**Alternatives Table 2** presents a summary of the comparative impacts of the five alternative sites with the proposed project. The Gilman Avenue site (ALT-B) and the Tuntex site (ALT-C) have the potential for greatest impacts of all the alternative sites due primarily to their proximity to residences and to their visibility. The two southernmost sites, Jamie Court (ALT-D) and the UGG site (ALT-E), would likely have the least environmental impacts overall but both offer reduced reliability benefits due to their locations south of the Martin Substation.

**Alternatives Table 2**  
**Comparison of Impacts: Alternative Sites**

<b>Issue Area</b>		<b>ALT-A Cargo Way</b>	<b>ALT-B Gilman Avenue</b>	<b>ALT-C Tuntex Site</b>	<b>ALT-D Jamie Court</b>	<b>ALT-E UGG Airport</b>
<b>Air Quality</b>		Similar to proposed project	Similar to proposed project	Similar to proposed project	Similar to proposed project	Similar to proposed project
<b>Biological Resources</b>	<b>Terrestrial</b>	Similar to proposed project	Similar to proposed project	Similar to proposed project	Similar to proposed project	Similar to proposed project
	<b>Marine</b>	Similar to proposed project	Slightly greater impacts than proposed project	Slightly greater impacts than proposed project	Somewhat greater impacts than proposed project	Somewhat greater impacts than proposed project
<b>Cultural Resources</b>		Less impact than proposed project	Less impact than proposed project	Similar or somewhat less than proposed project	Similar or somewhat less than proposed project	Less impact than proposed project
<b>Geological and Paleontological Resources</b>		Similar to proposed project	Similar to proposed project	Similar to proposed project	Similar to proposed project	Similar to proposed project
<b>Land Use</b>		Similar to proposed project	Greater potential than proposed project for land use disturbance	Greater potential than proposed project for land use inconsistency	Greater potential than proposed project for land use inconsistency	Greater potential than proposed project for land use inconsistency
<b>Noise</b>		No impact	No impact	No impact	No impact	Potential to impact homeless shelter
<b>Hazardous Materials Management</b>		Greater impacts than proposed project	Greater impacts than proposed project	Similar to proposed project	Similar to proposed project	Less impact than proposed project
<b>Socioeconomics</b>		Greater impacts than proposed project	Greater impacts than proposed project	Greater impacts than proposed project	Less impact than proposed project	Less impact than proposed project
<b>Soil and Water Resources</b>		Similar to proposed project	Similar to proposed project	Greater impacts than proposed	Less impact than proposed	Less impact than proposed
<b>Traffic and Transportation</b>		Inferior to proposed project	Inferior to proposed project	Inferior to proposed project	Similar to proposed project	Similar to proposed project
<b>Visual Resources</b>		No potential for significant impacts	Potentially significant visual impacts	Potentially significant visual impacts	No potential for significant impacts	No potential for significant impacts
<b>Waste Management</b>		Contaminants present but impacts mitigable	No data available	Contaminated site; current condition unknown	No data available	No contaminants known to be present

## **NO PROJECT ALTERNATIVE**

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The No Project Alternative assumes that the proposed project is not constructed. In this case, the No Project Alternative would be leaving the plant “as is.” Unit 3 (a 206 MW steam turbine unit) and Units 4, 5, and 6 (each 52 MW combustion turbines) would remain in operation. No new combined-cycle units would be added.

The Mirant AFC (SECAL, 2000a; AFC pages 9-4 to 9-6) states that the No Project Alternative would result in potentially greater environmental effects than the proposed project. According to the AFC, the No Project Alternative could result in the following conditions or actions (each of these issues is evaluated by staff in more detail below):

- Continued operation of the HPPP and increased operation of Potrero Units 3-6.
- Reduced ability to meet State policy objectives of increased competition in the generation market.
- Retaining environmental effects of the existing Potrero Power Plant (which would be reduced with implementation of the Unit 7 Project).
- Construction of new transmission lines to San Francisco (including the Jefferson-Martin line or a trans-bay line) or other power plants within San Francisco.
- Continued operation of other less efficient power plants in the region.
- Inability to convert the Potrero Power Plant site to port-related industrial uses (this would be true whether or not the proposed project is implemented).

Another component considered as part of the No Project Alternative is the potential for other power plants to be constructed on the San Francisco peninsula and north of the Martin Substation. If other plants were being planned or constructed in the area, it would be presumed that these facilities would be constructed whether or not the Unit 7 Project were approved. However, while other facilities may be under consideration by developers (see previous discussion of potential South San Francisco power plants), no applications are currently pending before the Energy Commission.

## **CONTINUED OPERATION OF HUNTERS POINT POWER PLANT**

The AFC repeatedly states that the major benefit of implementing the Unit 7 project would be the closure of the HPPP. Staff agrees that closure would constitute an environmental benefit in the CCSF area, and based on CCSF policies, has included HPPP closure as an objective in this alternatives analysis. However, at this time, closure of HPPP is not guaranteed if the Unit 7 project is constructed. First, the closure agreement is between PG&E and the CCSF; because Mirant is not a party to the agreement it cannot cause the plant to be closed. Second, the ultimate authority in determining when Hunters Point can be closed is the Cal-ISO; this decision will be based on the presence of adequate generation in and transmission to the San Francisco area.

PG&E has stated, “If the Potrero project is approved as proposed, we believe there is sufficient capacity to allow the closure of the Hunters Point Power Plant, without the

completion of the Jefferson-Martin line [see additional discussion under Transmission Alternatives, Appendix A]. However ... the closure of the Hunters Point Power plant cannot proceed until the CAISO deems it no longer necessary to meet reliability criteria and FERC relieves us of our must-run obligations” (PG&E, 2001a).

Assuming that the Potrero Unit 7 project is completed as planned, the ability of the system to meet Cal-ISO reliability criteria in the area will be determined primarily by both the estimated load growth for the area and availability of the Jefferson-Martin line. In a response to a data request, the Cal-ISO addressed a number of questions regarding the potential for closure of the HPPP (CAISO, 2001). The Cal-ISO has also listed a number of other local transmission system upgrades that are also required. At this time, the Cal-ISO transmission studies and load growth estimates are not available for periods after 2006. The Cal-ISO has informed staff that completion of Potrero Unit 7 will not allow a final determination regarding closure of HPPP until after PG&E’s San Francisco transmission connection (Jefferson-Martin 230 kV Project) is also installed.

The Cal-ISO’s San Francisco Peninsula Long-Term Electric Transmission Planning Technical Study (CAISO, 2000) states that a combination of Peninsula transmission upgrades may be sufficient to allow for the shut down of HPPP while still providing adequate transmission reliability. As discussed below under “San Francisco Peninsula Transmission Upgrades”, the two key projects identified are currently in the pre-permitting planning process at PG&E. Both face the possibility of permitting delays, so whether or when adequate transmission upgrades would allow the closure of HPPP without additional new generation is currently speculative.

The Cal-ISO states that it will not be able to determine the RMR status for Hunters Point generation until summer 2003, and points out that its current planning horizon extends only to 2006. The Cal-ISO also states that while “Preliminary assessments indicate that with the addition of the Jefferson-Martin 230 kV line and the Potrero Unit 7 Project, this would allow the shutdown of Hunters Point Power Plant while maintaining acceptable reliability levels in the City. However, as mentioned ... additional planning studies would be needed before a confirmation can be provided.”

Despite the environmental benefits of closing HPPP, given the Cal-ISO’s planning timeframe, staff cannot agree at this time that construction of the Unit 7 project is either necessary or sufficient for the closure of the HPPP. Therefore, it is unclear that the continued operation of Hunter’s Point is a consequence of the No Project Alternative.

## **REDUCED ABILITY TO ENHANCE RELIABILITY AND MEET STATE POLICY OBJECTIVES**

Staff agrees with Mirant that construction and operation of the proposed project would be consistent with State policy objectives that call for construction of additional power plants to enhance electric power reliability. In-city generation is needed to enhance reliability in San Francisco. Therefore, the No Project Alternative would be inconsistent with policy and reliability objectives.

## **ENVIRONMENTAL EFFECTS OF CONTINUED OPERATION OF THE POTRERO POWER PLANT**

The AFC states that the No Project Alternative would cause the area to “forego air emissions reductions that would occur with the development of Unit 7 and shutdown of the Hunters Point Power Plant.” As discussed above, it is not certain that the HPPP will be shut down. However, if the HPPP is shut down or if its operation is substantially reduced as a result of the Unit 7 project, there would be dramatic reductions in NOx and PM10. In the 1996 SFEC case, staff testified that a new project would dramatically reduce regional air emissions, even using the most conservative assumptions for system operation due to the displacement of older generating units with newer, more efficient units.

The Potrero Unit 7 project is not a “modernization” project in which older generating units would be taken off-line and replaced by more efficient and less polluting new units. The existing units (3, 4, 5, and 6) are expected to continue operation in addition to Unit 7, and once-through cooling for Unit 3 would continue to be used. While Mirant will implement selective catalytic reduction (SCR) technology in 2004 to reduce nitrous oxide emissions for Unit 3, this is expected to occur whether or not the Unit 7 project is approved. Therefore, staff finds no potential environmental benefits associated with the continued operation of Potrero Units 3-6 in the absence of the Unit 7 project.

## **CONSTRUCTION OF NEW TRANSMISSION LINES TO SAN FRANCISCO**

Additional transmission lines would be required for reliability under the No Project Alternative. Appendix A evaluates transmission lines as potential complete alternatives to the proposed project, and discusses several transmission projects, their potential impacts, and timing in more detail.

The Cal-ISO’s San Francisco Long-Term Study (SFLTS) evaluated options that would increase electric reliability for San Francisco. It studied a new generation option and five transmission options. The SFLTS concluded that a 400 MW generation facility would be an effective long-term solution to the San Francisco reliability problem, but that if new generation allowed closure of HPPP, the net increase in generation within San Francisco would be only about 200 MW where 400 MW are considered to be needed. As discussed in more detail in the Local System Effects section of this FSA, if the Hunters Point Power Plant is retired, the addition of Unit 7 would not lead to the deferral of any currently planned transmission facilities. Rather, Unit 7 would offset the need for *additional* future transmission reinforcements beyond those already in the transmission plan. Transmission options are summarized below.

### **San Francisco Peninsula Transmission Upgrades**

PG&E has started the process of preparing permitting documentation for the transmission route identified in the Cal-ISO’s study as being the preferred route: the Jefferson-Martin 230 kV Transmission Project. PG&E states:

“We are working closely with CAISO to plan, permit, design, and build new transmission facilities into San Francisco. Should the CAISO decide that the new Potrero Plant alone

is not adequate to meet reliability standards, we want to be sure a realistic back-up plan exists to speed plant closure” [of HPPP] (PG&E, 2001a).

Because the planning and environmental review processes for approval of both power plants and transmission lines require several years, PG&E is currently pursuing the transmission improvements that were defined in the SFLTS. As of January 2002, the application for the Jefferson-Martin Project is being prepared, and it is expected to be submitted to the CPUC in September of 2002 (PG&E, 2001b). If the permitting and construction proceeds under PG&E’s current schedule, it would be operational in 2005. However, the project may face significant permitting or construction delays, since the proposed route crosses several environmentally sensitive areas. PG&E’s schedule is not currently presented as contingent upon whether or not the Potrero Unit 7 project is approved.

Another transmission upgrade planned for the San Francisco peninsula is the upgrade of the San Mateo-Martin 60 kV line to 115 kV. PG&E has also started the process of preparing permitting documentation for this line, which PG&E hopes will be operational at the new voltage in early 2005 (PG&E, 2001b). Like the Jefferson-Martin 230 kV Project, this project crosses environmental sensitive areas, so the timing of permitting and construction is uncertain.

The SFLTS concluded that the combination of these two peninsula upgrade projects along with other system reinforcements, including reconductoring a portion of the San Mateo – Martin 115 kV #4 circuit and constructing a new Hunters Point – Potrero 115 kV line, could provide sufficient transmission capacity to shut HPPP and still maintain system reliability. A reliability analysis of the Greater Bay Area will be needed before a final decision can be made. Because the two main projects pass through sensitive biological and recreational areas and neither has begun the permitting process, staff is uncertain whether or when the projects will be completed.

### **Moraga-Potrero (Cross Bay) Transmission Line**

Another major transmission route was evaluated in the SFLTS: the Moraga-Potrero 230 kV Transmission Project (also called the “cross bay” transmission project). The Study addresses four bay crossing options: Bay Bridge, submarine cable, BART tube, and a combined Bay Bridge/submarine cable. The benefits of this route are that it would increase reliability by providing a different transmission source (Moraga Substation) to the CCSF (all existing transmission passes through the Martin Substation). As a result, this line would reduce the need for an RMR contract on the San Francisco Peninsula.

However, this route has major disadvantages. First, it is the highest cost of all transmission alternatives studied. Second, permitting would be time consuming and difficult, due to the requirement that 230 kV lines be installed through residential Oakland and across the East Bay hills where environmental impacts could be significant. Third, the technology of the bay crossing has not been defined, so its feasibility is still questionable.

### **Conclusion Regarding New Transmission**

The No Project Alternative may affect the timing of construction of new transmission lines. The Jefferson-Martin transmission line and the San Mateo-Martin 115 kV



upgrade are currently in the planning process, and these projects if are expected to be constructed whether or not Potrero Unit 7 is permitted and built. Permitting and construction of additional transmission reinforcements are likely to be required if Potrero Unit 7 is not permitted and built.

Staff believes that, overall, the No Project Alternative is not superior to the proposed project for the following reasons:

1. In the No Project scenario, it is less likely that the HPPP would be closed and replaced by a newer, more reliable facility in a timely fashion. While it is not certain that the HPPP would continue to operate with Unit 7, it is more likely that it would continue to operate in the absence of the Unit 7 project. If the Unit 7 project were not constructed, the HPPP's generation would remain important to provide electric reliability to the San Francisco north peninsula at least until the completion of two transmission upgrades for which PG&E is currently preparing permit applications. The HPPP facility is old, has high emissions, and is not as reliable as a newer facility.
2. In the No Project scenario, there would be greater reliance on Potrero Units 3 through 6, which are also older and have relatively higher emissions.
3. Without the Unit 7 project, staff expects the net emissions of NOx and PM10 in the state would be higher because other older, less efficient power plants (either inside or outside of the City of San Francisco) would be required to produce more power.
4. The No Project Alternative would likely result in (1) building of a power facility elsewhere on the northern San Francisco Peninsula, and/or (2) construction of additional transmission facilities to meet necessary reliability criteria. Depending on their location, these facilities would also have environmental impacts that could be significant.
5. The No Project Alternative would result in reduced reliability for San Francisco's electrical supply.
6. The No Project Alternative would result in continued system losses of between 42 MW and 102 MW that the Local Systems Effects analysis in this FSA shows would be eliminated with Unit 7 project. Over 20 years, the cost of these continued system losses have a present value at between \$55 million and \$80 million. As well as reducing the cost of producing power in California, these continued system losses would also contribute to a related increase in the use of fossil fuels, water, and the production of air emissions from the need for additional generation resources to make up the losses.

Staff agrees that both the major electric deregulation legislation, AB 1890 (1996), and, more recently, SB 110 (1999), have emphasized the necessity for the siting new power plants which increase reliability, improve the environmental performance of the current electric industry, and reduce consumer costs.

## RESPONSES TO PUBLIC AND AGENCY COMMENTS ON THE PSA

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### CITY AND COUNTY OF SAN FRANCISCO (CCSF)

**CCSF Introduction to Alternatives Comments:** *CCSF requests that the project objectives be broadened to allow consideration of a wider range of alternatives. In addition, CCSF states that without a “needs assessment,” the No Project Alternative or smaller project alternatives cannot be adequately evaluated.*

**Response:** The project objectives have been modified in this FSA. In response to CCSF concerns, the specific size (MW) of the plant has been removed, and an objective was added in support of conditions that would allow the closure of the Hunters Point Power Plant.

Regarding assessment of the need for the project, the Energy Commission is now required to evaluate applications for power plants on their environmental and policy effects, and to make decisions on the basis of impacts identified. However, a section has been added to the FSA (at page 3) called “San Francisco’s Electricity Supply and Demand” to provide the reader with information on this issue.

**CCSF-18A Evaluation of alternative sites:** *The analysis of site alternatives should be more detailed, including land use compatibility and environmental justice impacts. Constraints to each site should be defined, and the location of each site with respect to Martin Substation should be identified. Health effects of a plant at the SF Thermal Plant should be compared with the proposed site. The SF Thermal site has no nearby residences. The SF Thermal and City Asphalt plants could be used as cogeneration facilities as a part of a portfolio of generation alternatives that could reduce the size of the proposed plant.*

**Response:** The PSA and FSA present analysis of five site alternatives in each of 13 environmental and engineering disciplines. CEQA does not require that alternatives be analyzed at the same level of detail as the proposed project. However, for each site a sub-section has been added as to its reliability in comparison to the Potrero site and one describing infrastructure connections. Sites ALT-A, ALT-B, and ALT-C are considered to be comparable to the proposed project in their reliability, because they are at or north of Martin Substation. Sites ALT-D and ALT-E are near the airport, and as such are considered to be inferior in terms of reliability.

While the SF Thermal plant is adjacent to downtown on its north and west sides, there are residences and residential hotels to the south and east of the plant (south of Mission Street), in similar or closer proximity to those near the Potrero plant.

Based on PSA comments, this FSA considers a portfolio of alternatives (Appendix A, Integrated Resources Alternative). This alternative is still considered to be infeasible due to the difficulties in implementing such a combination given that a private applicant is proposing to build the proposed project.

**CCSF-18B Evaluation of transmission alternatives:** *The PSA did not adequately address transmission alternatives, and whether transmission is desirable in comparison to in-city generation. The PSA did not address the Remedial Action Scheme, analyze RMR contracts, or market power issues.*

**Response:** The discussion of transmission alternatives has been expanded in the FSA to specifically address the potential for construction of the Jefferson-Martin line, the Moraga-Potrero line, and others. The FSA also clarifies that in-city generation provides significant reliability and local transmission system benefits, but that transmission could also serve the city's needs. However, the environmental impacts of these new transmission lines could be substantial, and would require analysis prior to permitting. The Remedial Action Scheme, RMR contracts, and market power issues were considered to be beyond the scope of this analysis.

**CCSF-18C(i) Demand side management:** *Discussion is cursory and should state whether an assessment of need has been made, and how much conservation would be required to affect the size of the plant.*

**Response:** The discussion of demand side management has been expanded and updated information is presented, including effects of conservation during 2001. It is noted that conservation, which showed significant reductions in demand early in 2001 had slowed to 1.5% later in the year. As also presented in the FSA, the demand for power is expected to grow at about 2.4 percent per year through the next 5 years, so conservation would be unable to significantly reduce the need for new power. Also, demand side management does not account for the increase in reliability that would result from the additional in-city generation.

**CCSF-18C(ii) Distributed generation:** *Clarify why distributed generation (including co-generated district heating and cooling systems) is not a feasible alternative.*

**Response:** As discussed in the FSA, there is no mechanism (in the absence of local or other regulatory requirements) with which to implement distributed generation. Staff did not consider cogeneration and potential emissions reductions because the implementation of such a system is considered speculative at this time.

**CCSF-18C(iii) Renewable resources:** *Renewable alternatives may have higher costs, but they have lower environmental impacts. The PSA did not consider decentralized renewable facilities, appropriate for a dense urban environment as part of a portfolio of energy sources.*

**Response:** While some impacts of renewable resources may be lower than fossil fueled plants (particularly air emissions), other impacts can be greater (e.g., visual impacts of solar panels, noise and biological impacts of wind turbines). Such a portfolio of renewables would have to result from a local or state policy initiative, so the recently passed Solar and Renewable Power Proposition may allow local development of these renewables. However, in the context of this analysis, renewable options are not considered to be feasible because they do not meet project objectives: their implementation within the next two years are unlikely and they would not provide reliability conditions that would allow closure of HPPP.

**CCSF-18C(iv) Alternative generation capacities:** *A portfolio of generation options should be considered.*

**Response:** See response to 18A above.

## **BAY CONSERVATION & DEVELOPMENT COMMISSION (BCDC)**

**BCDC-1:** *Non-Siting Study. The PSA does not cite compliance with Public Resources Code Sections 25525 and 66645 in any of the discussions on laws, ordinances, regulations and standards. Pursuant to Sec 25526(b) of the W-A and Sec 66645(b) of the McAteer-Petris Act, BCDC approved the 1982 report entitled "Designation of Areas within the jurisdiction of the BCDC that are Unsuitable for Power Plants" (the Non-Siting Study). As the tile implies, the Non-Siting Study designates areas in and around the San Francisco Bay that are unsuitable for power plants and the BCDC make a recommendation on the proposed siting of the power plant based on this study. Section 25526(b) provides, in part, that the CEC shall not site any power plant in any location designated in the non-siting study as inappropriate for such facilities, unless BCDC determines that such use is not inconsistent with the primary use of land and there will be no substantial adverse environmental impact.*

**Response:** Government Code Section 66645(b) specifies that property currently used for a thermal power plant shall not be designated as unsuitable by BCDC in the Non-Siting Study. For this reason, the most recent Non-Siting Study explicitly excludes the Potrero Power Plant site from designation as unsuitable for a thermal power plant, though BCDC must still review the specific proposal to determine whether it is consistent with the McAteer-Petris Act and the Bay Plan.

In the review of possible alternative sites for the project, Energy Commission staff have not included an evaluation of whether the alternative sites are designated as unsuitable for a power plant in the Non-Siting Study. Three alternative sites, ALT-A, ALT-B, and ALT-C, appear to be outside of BCDC's jurisdiction. Site ALT-D appears to be within BCDC's jurisdiction, but a cursory review of the Non-Siting Study indicates that this site is not designated as unsuitable for a power plant. BCDC's designations are generally based on identified wildlife areas, parks, public access areas, areas designated for water-related industries, and natural resources areas. If a power plant were proposed for site ALT-D, review of current information would be necessary to verify whether the site is appropriate for a power plant given BCDC's criteria in the Non-Siting Study.

The fifth alternative site, ALT-E, is located on within the San Francisco International Airport. The Non-Siting Study designates the entire airport as an airport priority use area that is inappropriate for a power plant. However, when the Energy Commission reviewed the United Golden Gate Phase I project at this site (approved March 2001), it was determined that the project site was outside the BCDC jurisdictional boundary so that the Non-Siting Study designation was not legally binding. BCDC staff suggested at the time that a project at the same site that required a federal permit that triggered review under the federal Coastal Zone Management Act could result in applying the Non-Siting Study to designated areas that extend beyond BCDC's jurisdiction under state law. BCDC and Energy Commission staff would need to review this issue should

a proposal be made to site a power plant at the San Francisco International Airport that required review under the federal Coastal Zone Management Act.

## **POTRERO CITIZEN ADVISORY TASK FORCE (PTF)**

**PTF-8 Plant alternatives:** *The Assessment neglects to examine a range of viable alternatives to the plant, including building a smaller facility combined with aggressive distributed generation and energy efficiency deployment. A comprehensive evaluation of these options should be conducted. Likewise, there is no analysis of how the increased energy reliability provided by the plant will adversely impact the development of alternative, lower-impact, resources. The necessity of the closure of the Hunters Point plant is not adequately addressed.*

**Response:** Please see responses to CCSF comments above.

## **ELLIOT GOLIGER (EG)**

**EG-1 Low emission gas microturbine:** *Low emission gas microturbine generation should be required before any increased electricity generation is approved.*

**Response:** The Energy Commission cannot order applicants to implement specific generation technologies; the Energy Commission can only respond to applications that are submitted by evaluating impacts. Distributed generation (including potential use of microturbines) is considered in Appendix A. While microturbine technology is advancing quickly, this technology is not considered to be feasible as an alternative to a baseload power plant because of its cost (high in comparison to natural gas-fired baseload plants), the small generation capacity (requiring installation of a large number of turbines), and the difficulty in implementing this technology (since no applicant has presented such a project to the Energy Commission for consideration).

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## **ALTERNATIVES APPENDIX A: ALTERNATIVES ELIMINATED FROM DETAILED ANALYSIS**

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This section describes alternatives that did not satisfy the screening criteria for inclusion in the analysis, and includes the following:

- Transmission alternatives.
- Technology alternatives (including demand side management, distributed generation, and alternative generation types).
- Renewable resources, alternative generating capacities.
- Smaller power plant(s).
- An “integrated alternative” (consisting of several different types of generation). This alternative is addressed last because it incorporates components of the other potential alternatives listed above.
- Several alternative sites.

Each of these alternatives, and the reasons for their not being considered in this analysis, is addressed below.

### **TRANSMISSION ALTERNATIVES**

The AFC (SECAL, 2000a; AFC pgs. 9-10 to 9-12) addresses potential transmission alternatives that could improve the supply and reliability of electricity in San Francisco. Mirant references the Cal-ISO’s San Francisco Long-Term Study, and states, “... none of these alternative projects are actively being developed by PG&E or the ISO.” Mirant argues that the Unit 7 project is “the most practical and efficient alternative” in comparison to the transmission alternatives. In fact, as discussed under the No Project Alternative (above), PG&E is currently preparing documentation for applications to the CPUC for both the Jefferson-Martin 230 kV Project and the San Mateo-Martin 115 kV upgrade, described in the Long-Term Study.

Transmission system improvements under consideration by PG&E are described below. The “cross bay” transmission line is also described, although this line is not actively being planned. The cross bay transmission line would be necessary for reliability if there were no generation project within San Francisco.

#### **Jefferson-Martin 230 kV Project**

This project would involve the installation of a new 230 kV circuit from PG&E’s Jefferson Substation to the Martin Substation. The following components would be included:

- 8 miles of underground transmission line between Sneath Lane Substation and Martin Substation.
- 15 miles of overhead transmission line between Jefferson Substation and Sneath Lane Substation, installing tubular steel poles that would support the existing 60 kV line on one circuit and the proposed 230 kV line on the other circuit.

The route of the overhead transmission line would be primarily along the scenic Highway 280 corridor, through or adjacent to Woodside, Hillsborough, and Millbrae. The overhead line would cross watershed lands owned by the CCSF, in which PG&E

holds an existing easement allowing replacement of the existing 60 kV towers within a 50-foot wide easement. The route crosses endangered species habitat for the mission blue butterfly, the bay checkerspot butterfly, the San Francisco garter snake, and a number of serpentine related rare plants. A permit will be required from the U.S. Fish and Wildlife Service to replace the towers and install new conductors.

The underground portion could follow a route around Oyster Cove Marina, or a route along San Bruno Avenue.

PG&E is currently preparing its application for this project. The Jefferson-Martin project is expected to be filed with the CPUC in the fall of 2002 and, if approved and constructed on schedule, it would be operational in 2005.

### **San Mateo-Martin 115 kV Upgrade**

This project, which was considered in the SFLTS as an alternative to the Jefferson-Martin line but which may be constructed regardless of action on that project, would replace a single circuit existing 60 kV line with a 115 kV conductor. Reconductoring would occur across endangered species habitat along US 101 and over San Bruno Mountain. Potentially affected species are the California red-legged frog, San Francisco garter snake, San Bruno elfin, Callippe silverspot butterfly, and the mission blue butterfly. This project would likely require only a notice of construction from the CPUC.

The estimated operating date for the project is January 2005 (PG&E, 2001b).

### **Moraga-Potrero 230 kV Line (Cross Bay Line)**

The SFLTS considered four ways to cross the San Francisco Bay to provide new transmission to San Francisco from the 230 kV Moraga Substation. Each of these would require transmission upgrades east of the Bay that involve transmission line construction through several miles of residential neighborhoods in Moraga and the City of Oakland. The crossing of the Bay would require advanced engineering that has not yet been defined. Four options have been studied (using BART tube, using the proposed new Bay Bridge span, installing a new submarine cable across the Bay, and a combination of the Bay Bridge with new cable). There are no dates for this project, as its feasibility is questioned due to both environmental and engineering concerns.

### **Conclusion Regarding Feasibility of Transmission Alternatives**

A combination of Peninsula transmission upgrades (primarily the Jefferson-Martin and the San Mateo-Martin projects) would be needed to allow closure of HPPP without additional in-city generation. Because permit applications have not yet been filed with the CPUC for either of these Peninsula upgrade projects, when these projects will be permitted and built remains speculative. Because these transmission projects would not be operational until 2005 at the earliest, they do not meet project objectives.

While transmission improvements would improve reliability of the electric system in CCSF, they do not offer the level of reliability benefits provided by in-city generation. As discussed in more detail in the Local System Effects section of this FSA, the Potrero Unit 7 project would also provide significant system loss savings and reactive margin benefits to the transmission system that would not be realized through transmission improvements alone. Therefore, transmission is not considered to be an alternative to



generation for four reasons: (1) transmission does not meet project objectives (it provides less reliability benefit and would not be operational within the same timeframe as the proposed project); (2) the significant local system benefits demonstrated in the Local Systems Effects section of this FSA would not be attained; (3) the transmission improvements on the San Francisco peninsula currently in the planning process are expected to be completed regardless of the approval of the Potrero Unit 7 project; and (4) feasibility of the Moraga-Potrero (cross-bay) transmission line is doubtful and it could very well entail much higher environmental consequences.

## **TECHNOLOGY ALTERNATIVES**

### **Demand Side Management**

The Energy Commission is responsible for several programs to reduce electricity demand, the most notable of which are energy efficiency standards for new buildings and for major appliances. These programs are typically called “energy efficiency,” “conservation,” or “demand side management” programs. One goal of these programs is to reduce overall electricity use. Some programs also attempt to shift such energy use to off-peak periods.

The Energy Commission’s Energy Efficiency Standards for Residential and Nonresidential Buildings (Title 24, Part 6) were established in 1978 in response to a legislative mandate to reduce California’s energy consumption. The standards are updated periodically to allow consideration and possible incorporation of new energy efficiency technologies and methods. The Commission in 2001 as mandated by Assembly Bill 970 to reduce California’s electricity demand adopted new standards. The new standards went into effect on June 1, 2001. The standards (along with standards for energy efficient appliances) have saved more than \$20 billion in electricity and natural gas costs. It is estimated the standards will save \$57 billion by 2011 (CEC, 2001a). California energy building standards and appliance efficiency standards are generally considered to be the most stringent in the nation.

Since the Cal-ISO ordered rolling blackouts in January 2001 as a result of statewide electricity shortages, conservation efforts have resulted in dramatic reductions in electricity use. Electricity use for each month in 2001 (data available through November) ranged from 1.5 to 12 percent less than it was in 2000 (data available through November). Following is an excerpt from Governor Davis’ September 1, 2001 press release:

“The weather adjusted figures for August show an overall peak load reduction of 3,250 MW (or 7.7 percent) and after accounting for economic growth, the reduction was 3,796 MW (or 9 percent). The economic growth factor, which is developed from the Employment Development Department data, was 1.3 percent for August. In addition, last August, California had 12 days of Stage 1 or Stage 2 power emergencies. This August, there were no power emergencies. Overall energy use in August was down 1.6 million MWh (or 7 percent).”

The California Public Utilities Commission supervises various demand side management programs administered by the regulated utilities, and many municipal electric utilities have their own demand side management programs. The combination

of these programs constitutes the most ambitious overall approach to reducing electricity demand administered by any state in the nation.

The Energy Commission is also responsible for determining what the state's energy needs are in the future, using 5 and 12 year forecasts of both energy supply and demand. The Commission calculates the energy use reduction measures discussed above into these forecasts when determining what future electricity needs are, and how much additional generation will be necessary to satisfy the state's needs.

Having considered all of the demand side management that is "reasonably expected to occur" in its forecasts, the Energy Commission then determines how much electricity is needed. The most recent estimation of electricity needs is found in the Energy Commission's 2002-2012 Electricity Outlook Report (Draft, November 2001; expected to be finalized in February 2002).

With deregulation, the Warren-Alquist Act was amended in 1999 to delete the necessity of an Energy Commission finding of "need" in power plant licensing cases. In spite of the state's success in reducing demand to some extent in 2001, California continues to grow and overall demand is increasing. As stated in the Commission's most recent need determination, adopted in 1997, it is clear that conservation programs alone cannot displace the need for power generation in California's growing economy.

### **Distributed Generation**

Distributed Generation refers to small-scale stationary applications of electric generating technologies. Distributed power units may be owned by electric or gas utilities, by industrial, commercial, institutional or residential energy consumers, or by independent energy producers. They include generating technologies such as engines, fuel cells, small and "micro" gas turbines, solar photovoltaics (PV), and wind turbines, and may be combined with electric storage technologies such as batteries and flywheels (CEC, 2001b).

The Energy Commission recently published a report entitled "Distributed Generation: CEQA Review and Permit Streamlining" (CEC, 2000). Distributed generation is the generation of electricity from facilities that are smaller than 50 MW in net generating capacity, which is below the Energy Commission's power plant siting jurisdiction. Similarly, the California Public Utilities Commission (CPUC) has no permitting authority over these facilities unless an investor-owned utility will own the distributed generation facility. Instead, local jurisdictions - cities, counties and air districts - conduct all environmental reviews and issue all required approvals or permits for these facilities.

Developers of distributed generation facilities may apply for all required permits at the same time, but the sequence of permit application usually follows this order:

1. air permits,
2. land use approvals, such as conditional use permits, and
3. building permits.

Air permits are the first permits sought because air district requirements influence equipment selection. Once the distributed generation equipment has been selected, the

land use approval process can begin. Local governments must know what makes and models of equipment will be installed to evaluate potential significant environmental impacts (e.g., noise and aesthetics) and to specify mitigation measures. Building permits are sought last because construction plans must incorporate all project changes required by the local government planning authority to mitigate environmental impacts.

There are several incentive programs designed to provide financial assistance to those interested in operating Distributed Generation systems in California. Senate Bill 1345 (Statutes of 2000, Chapter 537, Peace, signed by Governor Davis in September 2000) directs the Energy Commission to develop and administer a grant program to support the purchase and installation of solar energy and small distributed generation systems. Solar energy systems include solar energy conversion to produce hot water, swimming pool heating, and electricity, as well as battery backup for PV applications. Small distributed generation systems include micro-cogeneration, gas turbines, fuel cells, electricity storage technologies (in systems other than PV), and reciprocating internal combustion engines.

However, feasibility and environmental impacts are problems for these technologies. A number of serious barriers, including technical issues, business practices, and regulatory policies, make interconnection to the electrical grid in the United States difficult (Alderfer, 2000). Broad use of distributed resources would likely require regulatory support and technological improvements.

In evaluating the ability of distributed generation, including renewables, to meet the need for local generation in San Francisco to help support system reliability, it is important to understand the relationship between the electrical transmission and distribution systems. The transmission system consists of a network of high-voltage (typically 115 kV and higher) lines that provide the mechanism for bulk transfer of electricity. Large generating stations like the Potrero Power Plant connect to the transmission system. The distribution system consists of low-voltage (typically 12 kV to 69 kV) lines that deliver power from the transmission system to end-users, typically at 120 or 240 volts. Because most distributed generation would be located near end-users, it would not feed power into the transmission system. For this reason, its effect on the transmission system would be better understood as a reduction in demand rather than an increase in supply.

To the extent that San Francisco's reliability problem is the need to match peak supply (either through in-city central station generation or through imports through the transmission system) with local peak demand, the ability of distributed generation to help solve the problem is the same whether viewed as increased supply or decreased demand. As discussed in more detail in the Local System Effects portion of this FSA, though, matching bulk supply and demand at the peak is only half the reliability problem. Also of concern is reactive power, or voltage support. The reactive power impacts of central station power plants on the transmission system are well understood and relatively easy to model. As shown in the LSE section, Potrero Unit 7 would have a large reactive power benefit for the San Francisco peninsula. The reactive power effects of widely adopted distributed generation are not well understood and cannot be easily modeled at this time, especially for a highly uncertain mix of distributed generation technologies. For this reason, staff is unsure of the reliability impacts that

would result from widespread adoption of renewables and other distributed generation technologies in San Francisco.

Additional problems of specific types of distributed generation include the following:

- **Renewable Energy Sources.** The high cost and limited dispatchability of small-scale renewable energy sources such as solar, wind, and biomass essentially inhibit their market penetration (Iannucci, 2000; see the following section for discussion of larger scale renewable energy). In addition, biomass and wind facilities require specific circumstances for siting, and have their own environmental consequences.
- **Fuel Cells.** The present high cost of and small generation capacity of fuel cells precludes their widespread use.
- **Other Fossil-fueled Systems.** Microturbines and various types of engines can also be used for distributed generation; these technologies are advancing quickly, becoming more flexible, and impacts are being reduced. However, they are still fossil-fueled technologies with the potential for significant environmental impacts, including noise. Such systems also have the potential for significant cumulative air quality impacts because individually they are typically small enough to avoid the regulatory requirements for air pollution control. Therefore, use of enough of these systems to constitute an alternative to the proposed project would potentially cause significant unmitigated air quality impacts.

**Summary: Distributed Generation.** Distributed energy is not a feasible alternative to the proposed project because of technical, institutional, and regulatory barriers. Some types of distributed generation are not feasible alternatives because they are not presently economical, and others are not feasible because they have the potential to cause significant unmitigated environmental impacts. Distributed sources would not meet project objectives of allowing increasing reliability of power in CCSF and the closure of HPPP. In addition, the applicant could not practically implement them.

## RENEWABLE RESOURCES

Reliance solely on fossil-fuel fired power plants does create both environmental impacts and a dependence on a single type of energy source. Therefore, renewable resources are attractive power sources. As of 2001, about 54% of California's in-state generation was from oil, gas, and coal plants and 38% from hydroelectric, wind, waste-to-energy, geothermal, and solar plants.

Staff examined the principal renewable electricity generation technologies that could serve as alternatives to the proposed project and do not burn fossil fuels. These technologies are geothermal, solar, hydroelectric, wind, and biomass. Each of these technologies (other than biomass) could be attractive from an environmental perspective because of the absence or reduced level of air pollutant emissions. However, these technologies also cause environmental consequences and have feasibility problems.

**Biomass.** Biomass facilities are generally in the 3 to 10 MW range, must overcome significant fuel source reliability issues, have difficulty being economically competitive, and are typically worse from an air quality perspective than natural gas. For these reasons such a project would not be a feasible alternative, nor would it be likely to sufficiently satisfy project goals.

**Solar.** California currently produces about 400 MW of power from solar thermal projects. Centralized solar projects using the parabolic trough technology require approximately 5 acres per megawatt. A 600 MW plant would require approximately 3,000 acres. Photovoltaic arrays require similar acreage per megawatt.

While solar photovoltaics are technically feasible and California clearly has a climate where this technology would be useful, the cost of these systems currently prohibits their widespread use. Recent estimates by the Energy Commission considered that photovoltaics might be able to provide a maximum of 221 MW of statewide generation over the next 10 years. The Sacramento Municipal Utility District (SMUD), which has a long-standing solar program, recently announced it has reached 10 MW of solar electric installations within the district, including a 3.9 MW photovoltaic central station power plant at Rancho Seco (SMUD, 2002). SMUD also announced that it had installed more than 1.6 MW of photovoltaics in 2001 alone, including 1.2 MW at 220 homes and businesses. SMUD's solar installations represent more than half of the grid-connected photovoltaics in the United States, and as such represents the most aggressive solar program implemented at a metropolitan scale in the country. Implementation of photovoltaics at any significant scale in the near term in the San Francisco would likely require extensive regulatory support and financing from government sources similar to that provided by SMUD. CCSF recently adopted a \$100 million bond measure to support development of renewables, and is currently developing a draft Energy Resource Plan, which is expected to be issued in February 2002. Until an implementation plan for the bond measure and the Energy Resource Plan is finalized, it is unclear what resources CCSF will be putting into developing in-city renewable energy resources. Given the project objectives of providing reliable baseload energy in the near term, this technology is not considered to be a feasible project alternative.

**Wind.** California currently generates about 1,800 MW of electricity from 105 separate wind facilities. The areas in California with the best wind resources have already been developed. Centralized wind generation areas generally require 40-50 acres per megawatt, with 600 MW requiring 24,000-30,000 acres. Extensive wind generation would also require additional transmission to serve areas of high demand. This alternative is considered infeasible because there is not adequate area for significant wind generation within CCSF, so this source would not meet project objectives for increased reliability or closure of HPPP.

**Hydroelectric Power.** Hydroelectric resources require inundation of large land areas in order to generate 600 MW of electricity. Large hydroelectric facilities generating 600 MW would inundate at least 30,000 acres with water, and are clearly infeasible within or near San Francisco. Even if the CCSF were to desire to construct new hydroelectric facilities in the Sierra Nevada, permitting for new hydro facilities is now extremely difficult due to environmental concerns, and such new facilities would require long transmission lines into San Francisco.

**Conclusion Regarding Renewable Resources.** As described previously, the CCSF in November of 2001 passed a proposition that would provide \$100 million to support solar power and other renewable programs. In addition, the City is preparing an Energy Resource Plan (in accordance with the Maxwell Ordinance) to guide the various energy efforts underway in the City. A draft plan is expected to be released for review in February 2002. These programs will likely result in increased solar (or other renewable) generation within the CCSF. The City has not yet determined the amount of power that might be generated with the \$100 million investment, nor do they know how long it will take to invest the \$100 million in order to fully implement the program. Therefore, while implementation of the bond measure and the Energy Resource Plan may reduce the City's future reliance on fossil fuel plants, it is very unlikely to occur within the timeframe stated in the objectives of this project. It is also unlikely that enough power will be generated in the near term to significantly affect transmission reliability or the ability to close HPPP, separate from the completion of currently proposed transmission upgrades and the Potrero Unit 7 project.

The renewable technologies discussed above have the advantage of not requiring the burning of fossil fuels and the environmental and resource impacts associated with natural gas fired power. However, these technologies also have the potential to cause significant land use, biological, cultural resources, and visual impacts. They also have substantial cost and regulatory hurdles to overcome before they can provide substantial amounts of power. In summary, staff has eliminated these alternatives because: (a) they cannot feasibly meet project objectives, and (b) they have the potential to create potentially significant environmental effects of their own.

## **SMALLER GENERATING FACILITIES**

Two possibilities are considered as potential smaller generating facilities in the CCSF. First, construction and operation of a smaller plant at the existing Potrero site is evaluated. Second, consideration of smaller plants at other sites is addressed.

### **Smaller Plant at the Potrero Site**

A power plant with a smaller generating capacity (e.g., 200-300 MW rather than 540 MW) could reduce some of the environmental impacts of the proposed project at its current location. Impact reductions could result in the following issue areas:

- **Land Use:** A smaller power plant at the same site would not require as large an area as the proposed project. However, given that the proposed project would be located entirely within the site already owned by the applicant, this issue cannot be seen as significant.
- **Noise:** A smaller plant would be less noisy. However, noise from the proposed facility is not considered to create a significant impact.
- **Air Quality:** Assuming the same generation technologies and air quality protection measures, a smaller plant would result in proportionally fewer air emissions.
- **Water:** A smaller capacity power plant would have lower water needs (both intake and discharge), so the potential for marine biological impacts would be reduced.

- **Visual Resources:** A smaller power plant would have less visual impact than the proposed project. Analysis of a specific design would be required to precisely determine the visual impacts of a smaller power plant.

In summary, a power plant with a smaller capacity may reduce to some degree the water, air quality, and visual impacts of the project. However, a smaller plant may fail to meet important project objectives. Specifically, the reliability benefits, reduction in system losses, and reactive power support of a smaller plant would also be proportionally reduced. Therefore, staff finds that a smaller plant at the Potrero site would not meet project objectives.

### **Smaller Plants at Other Sites**

Two potential sites for smaller facilities were considered, including the SF Thermal site (near Mission and 5th) and the City Asphalt Plant (at Quint and Jerrold). These sites were eliminated from consideration as alternatives to the proposed project due to their small size. This section considers these sites as alternatives that are acknowledged to be smaller than the proposed project, and that may be used together or in combination with other alternatives.

The environmental impacts of a smaller plant would normally be proportionally less than those of a large plant, as discussed in the previous section. However, if two smaller plants were constructed (at 200-300 MW each) to replace a single large plant of 540 MW, the overall environmental impacts may actually be greater because they would occur in different places, rather than concentrated at one locality. As described in this analysis, other potential San Francisco sites for power plants are actually less suitable for a power plant than the Potrero site, and would probably involve higher overall impacts. The area immediately surrounding the SF Thermal plant is commercial and industrial, but there are residential buildings within about 4 blocks of this site. At the City Asphalt Plant, there is a dense residential neighborhood only two blocks to the east and south of the plant.

Therefore, construction of smaller power plants at these sites do not qualify for further analysis because: (a) they do not meet the staff's criteria for power plant sites (a major criterion was identification of sites with residences no closer than those around the Potrero site), and (b) taken together, they do not offer the possibility of elimination or reduction of environmental impacts of the proposed site. If evaluated separately, a smaller plant would not meet the project objectives of increased reliability and allowing closure of HPPP.

## **INTEGRATED RESOURCES ALTERNATIVE**

Several parties commenting on the PSA suggested consideration of an alternative that would be made up of several components, rather than consideration of only a single gas-fired power plant. The components could include a combination of the following:

- Demand side management (including use of energy efficient technologies)
- New transmission lines
- Development of solar power within CCSF

- Distributed generation
- One or more smaller generating facilities or co-generation facilities.

While each of these components is technically feasible and could be implemented on some limited scale in CCSF, each also has environmental and regulatory obstacles to their implementation (described above). The combination of these alternatives would have no fewer obstacles than they would individually. Furthermore, implementation of a combination of resources could not be accomplished by the applicant in this project, and would require regulatory changes or financial incentives that are not available in today's market.

## **ALTERNATIVE SITES**

### **Applicant's Alternative Site**

Mirant's AFC considered two alternative sites: Cargo Way and the Western Pacific site. The Cargo Way site is evaluated as ALT-A. The Western Pacific site was eliminated as described below.

#### **Western Pacific Site**

This site has approximately 30 acres and is located south of 25<sup>th</sup> Street and east of Illinois Street. The site is zoned for heavy industry, but the Port of San Francisco offers it as part of a Mixed Use Opportunity Area. Currently, much of the site is under construction for use as a SF Municipal Railroad (Muni) maintenance yard. This site has been eliminated from consideration because: (1) the Muni development will occupy much of the land, and (2) the site is so close to the proposed Potrero site (less than 1,000 feet south) that it would not eliminate or reduce any of the impacts of that site.

### **Sites Considered in SFEC Staff Assessment**

#### **SF Thermal**

This site is located between 5<sup>th</sup> and 6<sup>th</sup> Streets, between Market and Mission, adjacent to the City's steam generating plant. The site is currently used as a parking lot. The location of this site was determined to be inappropriate for a power plant since it is near heavily used commercial areas (Market Street shopping to the north) and public areas (Metreon, etc. to the south) and surrounded by scattered residential pockets.

#### **City Asphalt Plant**

This facility, which is currently operating, is located at the corner of Quint and Jerrold, near the Southeast Water Treatment Plant. The site is small and triangular-shaped (adjacent to the railroad), and could support only a smaller power plant. The site was eliminated because, with residential neighborhoods only two to three blocks away, it would not eliminate any impacts of the proposed project.



## **Sites Identified by Staff**

### **Carroll Avenue, North of 3Com Park**

This site is currently used as a parking lot for events at 3Com Park, and is located at the east end of Carroll Avenue adjacent to State Park lands. The vacant lot may become less used as events at 3Com Park are discontinued. However, this site was eliminated because there are residential properties located less than one block away, to the south.

### **South San Francisco, Belle Air Road**

This site is within an industrial area of the City of South San Francisco, east of the 101 Freeway and north of North Access Road. The land is used primarily for the City's water treatment facilities, and only a small area would be available for use as a power plant. Therefore the site was eliminated for feasibility concerns.

### **3Com Park**

Since the park itself is likely to become obsolete in the future, its location was considered for a power plant site. However, because the timing of the potential discontinued use is not certain, there are residences to the north and west, and parkland surrounds the site, the site was eliminated from consideration.

## **ALTERNATIVES APPENDIX B: ANALYSIS OF ALTERNATIVE SITES**

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### **AIR QUALITY**

#### **Tuan Ngo**

The purpose of this air quality alternative analysis is to provide an approximate comparison of the air quality impacts of the Potrero Unit 7 project at the proposed site and the five alternative sites. All are located in the Bay Area Air Quality Management District (District).

With respect to air quality, the same federal, state, and local LORS apply to the proposed site and the five alternative sites. A discussion of the applicable LORS can be found in staff's **Air Quality** testimony.

All five alternative sites and the proposed site are located in the same type of terrain. Thus the project emission impacts, as presented in the staff **Air Quality** testimony, would likely be similar at the proposed and each alternative site.

BACT requirements are similar for combined cycle projects in the district's boundary. For NO<sub>x</sub>, an emissions rate of 2.5 ppm on a three-hour average, and an oxidation catalyst to control CO and organic emissions would qualify as BACT for the project at any site.

Offset requirements would be the same if the project is located at any alternative sites, or the proposed site.

Staff believes that the air quality impacts from the five alternative sites and the proposed site would be essentially the same for all sites.

## BIOLOGICAL RESOURCES

Potential impacts to aquatic biological resources from the applicant's proposed project could occur from in-water construction of new intake and outfall facilities, entrainment and impingement by the intake of Bay waters, and the discharge of heated cooling water. For the purpose of this analysis, it is assumed that all five alternative sites would use once-through cooling water from San Francisco Bay. Any site that would not involve intake or discharge of Bay waters would have little to no impact on aquatic biological resources and, thus, would be less impacting to aquatic resources than the proposed project at the Potrero site. Impacts to terrestrial biological resources could result from habitat loss or disturbance or impacts on sensitive species. The reader should refer to the **Biological Resources** section of this FSA for the proposed project, which evaluates the impacts to biological resources at Potrero.

In the following discussion, terrestrial biological resources are addressed first, followed by aquatic biological resources.

Any federal, state and local LORS pertaining to biological resources would apply to all the alternative sites, although it is important to note that Alternatives A and B are in the City and County of San Francisco and Alternatives C and D are in San Mateo County. Alternative E is within the jurisdiction of the San Francisco International Airport.

### Terrestrial Biological Resources

#### Shari Koslowsky

The following table provides a summary of each of the alternative sites, geographical reference, sensitive habitats in the vicinity and sensitive species occurrences on or adjacent to the site. Information is provided relative to the applicant's selected site in order to facilitate comparison to that site.

**Alternatives Table A1**  
**Summary of Alternatives and Sensitive Terrestrial Biological Resources**

Alternative	Location from Potrero Site	Vegetation or Wildlife Habitat in or Immediately Adjacent to Site	Sensitive Biological Resources
ALT- A, Cargo Way Site Cargo Way, San Francisco	0.75 miles south, 1000 feet south of Islais Creek	Industrial lot.	No occurrences of Federal or State threatened or endangered species on or adjacent to the site.
ALT – B, 3Com Park Site Gilman Av., San Francisco	2.75 miles south, north of 3Com Park	Sparsely vegetated lot.	Bayview Park, approx. 0.5 miles to the SW. CNDDDB registers occurrence of Diablo helianthella ( <i>Helianthella castanea</i> ) in the park.
ALT – C, Tuntex Site Bayshore Blvd., Brisbane	3.6 miles south, near railroad yard	Large vacant, sparsely vegetated lot adjacent to rail. Several (6) blacktail jackrabbit ( <i>Lepus californicus</i> ) were observed.	No occurrences of Federal or State threatened or endangered species on or adjacent to the site.
ALT – D, South San Francisco Site E. Jamie Ct.,	8 miles south	Vacant lot, disturbed surface soil and vegetation, small patches of dense herbaceous vegetation. Lot ends approx. 30 feet from	No occurrences of Federal or State threatened or endangered species on or adjacent to the site.

<b>Alternative</b>	<b>Location from Potrero Site</b>	<b>Vegetation or Wildlife Habitat in or Immediately Adjacent to Site</b>	<b>Sensitive Biological Resources</b>
South San Francisco		shoreline.	
ALT – E, United Golden Gate Site North Access Road, San Bruno	8.5 miles south SF Airport, at United Golden Gate cogeneration plant	Site located in parking lot. Nearest habitat is marsh (San Bruno Slough) located on opposite side of North Access Road, approx. 75-100 feet north. Observed waterfowl, cordgrass, pickleweed and saltgrass.	San Bruno Slough immediately to the north. No occurrences of Federal or State threatened or endangered species on or adjacent to the site.

Staff did not complete an exhaustive field survey of each alternative site. Instead, a field reconnaissance was completed and wildlife or wildlife within or near the site was noted. All alternatives are located within commercial and/or industrial areas. Alternatives A, B and C are located inland from the shore and Alternatives D and E are located on or very near the shoreline. Alternatives A, C and E are or have been considered for siting of other energy facilities and previous analyses did not indicate adverse biological impacts.

According to the California Natural Diversity Database (CNDDDB), none of the sites overlap with or are adjacent to occurrences of state or federally listed threatened or endangered species. Because of the location of these sites any potential habitat in the area is extremely fragmented and therefore, the analysis of sensitive species focused on occurrences either on or adjacent to the alternative site, rather than a larger radius. Relatively speaking, Alternatives A and E, like the selected Potrero site offer negligible to no habitat resources on the site relative to the other alternatives that do support some disturbed vegetation. At alternative sites B, C and D, the soil surface has been disturbed and compacted, there is not surface water present on the site, vegetation is sparse and cover is limited in all cases to herbaceous plants. No native trees, riparian or other sensitive habitats or vegetation are found in or immediately adjacent to any of the alternative sites.

This does not preclude the presence of wildlife (see ALTERNATIVES Table A1, Alternative C) that can adapt to urban conditions. In this respect, the CNDDDB indicates that it is unlikely that wildlife would include sensitive species. The sighting of jackrabbits at Alternative C is in part, because this site can provide habitat resources by virtue of its being part of a larger area of abandoned land adjacent to the railroad tracks where there are no buildings or human access.

Because these sites are abandoned lots or parking lots within developed zones, there is little or no opportunity for wildlife movement among patches of better habitat. The only possible exception would be Alternative D, where wildlife movement could occur along the shoreline.

The results of this analysis indicate that none of the alternative sites would result in significant direct impacts to terrestrial biological resources within the footprint of the project.

With respect to off-site indirect impacts, Alternative B is located northeast of Bayview Park, while Alternative E is immediately south of San Bruno Slough. Primary sources of off-site, indirect impacts to terrestrial biological resources may occur from noise and air emissions. With respect to noise, Alternative B is located below and far enough away from Bayview Park, such that noise impacts would be negligible. Alternative E is located near the airport, adjacent to the existing cogeneration plant and is separated from San Bruno Slough by a road where there is considerable continuous and intermittent noise during the day. Therefore, the additional noise source is unlikely to cause significant increases to either continuous or intermittent noises. With respect to air emissions, Alternative B is located downwind of Bayshore Park, relative to the predominant wind direction and Alternative E is located upwind of the slough, although any emissions from a potential power plant are likely to be dispersed beyond the immediate vicinity of the marsh.

The **Terrestrial Biological Resources** section of the Final Staff Assessment addresses potential impacts of air emissions on San Bruno Mountain located to the southwest of the Potrero site. The alternative sites are nearer to this site and therefore, offsite emissions may have a slightly greater impact; however, similar to the analysis provided in that section these impacts are considered insignificant since the majority of emissions would be dispersed to the northeast (away from San Bruno Mountain).

Therefore, none of the alternative sites would result in significant indirect off-site impacts to biological resources from noise or air emissions.

## **Conclusion**

Staff believes that locating the project at any of these alternative sites is unlikely to result in significant environmental impacts to terrestrial biological resources.

## **Aquatic Biological Resources**

### **Noel Davis, Mike Foster, and Rick York**

Staff conducted a preliminary analysis of biological resources potentially present at the five alternative sites for the Potrero project. The analysis is based on general information about the distribution of aquatic species in San Francisco Bay. No site-specific surveys of aquatic resources were conducted at the alternative sites.

## **Summary of Proposed Project Impacts**

Staff has concluded that permanent loss of Bay habitat from construction of the cooling water intake, and impingement and entrainment from the intake of Bay water for the cooling water system may be significant at both the project-specific and cumulative levels. Staff expects that with sufficient mitigation/compensation the impacts of Bay fill can be mitigated to a less than significant level. Removal of an appropriate area of existing artificial structures would compensate for the fill of 0.24 acres of Bay habitat. Removal of Pier 5 in the Pier 70 vicinity is likely to provide at least partial mitigation for Bay fill impacts.

The applicant has not proposed mitigation for the loss of planktonic organisms due to entrainment at the intake. It is not clear that, even with mitigation, these impacts can be mitigated to insignificant. To avoid further impacts that may have implications that are

impossible to predict, staff recommends that the proposed project be required to employ an alternative cooling technology.

The applicant has provided information from surveys to update information on the occurrence of aquatic species at the site. Species of potential concern that may be affected by the proposed project at the Potrero site include Pacific herring, Bay shrimp, Dungeness crab, longfin smelt, green sturgeon, Chinook salmon and steelhead.

Pacific herring, which spawn in the vicinity of the Potrero Power Plant, support an important commercial fishery in San Francisco Bay. They lay their eggs in shallow water on hard substrate or on marine vegetation. Bay shrimp also have been collected in the vicinity of the Potrero site. There is a live bait fishery for bay shrimp in San Francisco Bay. Key fishing locations include South Bay, northwestern San Pablo Bay and Carquinez Strait.

San Francisco Bay is an important nursery area for Dungeness crabs, which support a commercial fishery outside the Bay. In monthly otter trawl surveys in 2001, the applicant collected substantial numbers of Dungeness crab in the vicinity of the Potrero Power Plant.

Longfin smelt, a Federal Species of Concern and State Species of Special Concern, are common in the vicinity of the Potrero Site.

Green sturgeons are a Federal Species of Concern and a State Species of Special Concern. San Francisco Bay estuary supports the southernmost reproducing population of green sturgeon, which spawn in the Sacramento River. They have a slight potential to occur in the waters near the Potrero Plant and be affected by the proposed project.

Three runs of Chinook salmon spawn in the Sacramento River, and to a lesser extent, the San Joaquin River. The adults move from the Pacific Ocean through San Francisco Bay to their spawning rivers where they spawn and die. When the smolts are 1 year old, they move downstream through the Bay to the ocean. The winter run is Federal and State Endangered. The spring run is Federal and State Threatened. The Central Valley fall/late fall run is a State Species of Special Concern. Critical Habitat for Chinook salmon does not extend south of the San Francisco-Oakland Bay Bridge, but Chinook salmon are sometimes collected in the vicinity of the Potrero Plant and could be affected by the proposed project.

The Central California Coast Evolutionarily Significant Unit (ESU) of steelhead is Federal Threatened. Existing steelhead runs occur in several streams in south San Francisco Bay. All of South San Francisco Bay is within designated Critical Habitat for the Central California Coast ESU and the species has the potential to be affected by the proposed project at the Potrero site.

## **Alternative Sites**

### **ALT-A Cargo Way, San Francisco**

This alternative site is very close to the proposed project site at Potrero. The aquatic species that have the potential to be affected at this site would be the same as for the proposed project. Assuming that a power plant at this site would use a cooling water system that withdraws water from San Francisco Bay, the impacts to aquatic resources would be similar to the proposed project at Potrero.

### **ALT-B 3Com Park Area, Gilman Site**

This alternative site is further south than the applicant's proposed site at Potrero. The distribution of aquatic resources near this site would still be expected to be similar to that at Potrero. However, there is some intertidal mudflat habitat near this site.

Therefore, there is some potential for a greater diversity of species to be affected by cooling water intake and discharge. Therefore, the impacts to aquatic resources might be slightly greater than that of the proposed project at Potrero if cooling water were withdrawn from the Bay and discharged to Bay waters.

### **ALT-C Tuntex Site, City of Brisbane**

If cooling water were withdrawn and discharged to the Bay at this site, the impacts would be expected to be similar to ALT-B. The fish and epibenthic invertebrates of concern that may be affected would be similar to those at the proposed project site at Potrero. However, the presence of intertidal mudflats along this section of the shore might result in a more diverse assemblage of species being affected and impacts to aquatic resources might be slightly greater than those for the proposed project.

### **ALT-D South San Francisco (East Jamie Court) and**

### **ALT-E SF Airport (United Golden Gate Site)**

Both of these sites are considerably south of the proposed project site at Potrero. Therefore, if they used cooling water from the Bay a somewhat different assemblage of species might be affected by cooling water withdrawal and discharge. The aquatic assemblage of South Bay would be expected to be less marine in character than that near the Potrero site because of the greater distance to the Golden Gate. Recruitment may be more variable because of the lack of ocean influence. Therefore, the overall potential to affect aquatic species by cooling water intake and discharge may be greater at this site than at Potrero. Furthermore, potential impacts on Bay shrimp and steelhead may be somewhat greater than at the Potrero site. Remnant steelhead runs occur in several South Bay creeks that are closer to these sites than Potrero. The South Bay is one of the areas fished most heavily for Bay shrimp. These sites are also close to intertidal mudflats that would be expected to support a different assemblage than at Potrero.

On the other hand, the chances of affecting Chinook salmon and green sturgeon would be less than at Potrero because these sites are considerably south of the major migration paths of these species. There also might be a somewhat reduced chance of impacting Dungeness crab, longfin smelt, and Pacific herring because the population centers for these species are Central and/or San Pablo Bays.

Overall, because these sites would affect waters that are somewhat more isolated from the ocean than the Potrero site, the potential for impacts to aquatic resources is likely to be somewhat greater.

## Conclusions

If cooling water were withdrawn from and discharged to San Francisco Bay for each of these alternatives, the impacts to aquatic biological resources would be similar to those of the proposed project at Potrero. None of the alternative sites would result in a lower impact to aquatic resources than the proposed site at Potrero. Assuming a similar intake and outfall design and a similar volume of water withdrawal, the impacts of ALT-A Cargo Way, San Francisco would be almost identical to the proposed project because the location is so close to Potrero. ALT-B and ALT-C might have slightly greater impacts to aquatic resources than Potrero because of the proximity of intertidal mudflats, a habitat that does not occur in the vicinity of the Potrero intake and outfall. ALT-D and ALT-E would have less potential than the proposed project to impact Chinook salmon, Green sturgeon, Dungeness crab, Pacific herring and longfin smelt, but might be more likely to affect steelhead and Bay shrimp. ALT-D and ALT-E might also affect intertidal mudflat habitat. Overall, the impacts of ALT-D and ALT-E on aquatic resources is considered to have the potential to be greater than the proposed project and ALT-A, ALT-B, and ALT-C because the more southerly part of South Bay represents a more unique environment than the northerly portion and one with less ocean influence.

## CULTURAL RESOURCES

### Roger Mason, Ph.D.

Five alternative sites for the Potrero Power Plant Unit 7 Project have been selected for analysis. The purpose of this analysis is to compare the five alternative sites with the proposed Potrero site on the basis of expected impacts to cultural resources. Please refer to the **Cultural Resources** section of this document, which evaluates the impacts to cultural resources from the use of the Potrero site.

Any federal, state, and local LORS pertaining to cultural resources would apply to all the potential sites. Please refer to the **Cultural Resources** section.

The proposed site is located on the shoreline of San Francisco Bay in southeastern San Francisco County. The alternative sites are located on or near the shoreline and are located in southeastern San Francisco County and northeastern and eastern San Mateo County. Staff has identified the following alternative sites:

- ALT-A: Cargo Way, San Francisco
- ALT-B: 3Com Park Area, Gilman Site
- ALT-C: Tuntex Site, City of Brisbane
- ALT-D: South San Francisco, East Jamie Court
- ALT-E: San Francisco Airport, United Golden Gate (UGG Site)

Refer to the section on **Alternatives Description** for the specific location of the alternative sites.

### **Summary of Proposed Project Impacts**

The proposed project at the Potrero property has the potential to affect buried historical resources. Historical research indicates that a mid-nineteenth century powder magazine and an associated dwelling once occupied the property. Structural remains and refuse associated with these structures could be encountered during excavations associated with new power plant facilities. In addition, the applicant proposed to demolish two structures evaluated as eligible for the National Register of Historic Places (NRHP); as required by the San Francisco unreinforced masonry building ordinance. These two structures are the Compressor House and the Meter House, which were part of a gas plant where gas was manufactured from petroleum. Staff has determined that moving rather than demolishing the historic buildings would reduce the impacts to cultural resources to a less than significant level. Although staff has ascertained that it is feasible to move the buildings, at this time there is no surety that one or more nearby parcels of vacant land could be the permanent home for these buildings. Staff will explore the possible use of the nearby vacant parcels for relocation of the buildings in an attempt to provide this surety at the evidentiary hearing. Staff has proposed a condition of certification that would require moving the structures to a new location, and will recommend at the evidentiary hearings whether this condition should be imposed. If the buildings must be demolished because no suitable location can be found, the demolition of the buildings will be an unmitigable significant impact.

### **Alternative Sites**

A cultural resources records search was performed for the five alternative locations by the Northwest Information Center of the California Historic Resources Inventory. Information provided by the information center included archaeological and historical resources site records, a bibliography of previous surveys and investigations and the mapped locations of sites, resources, and surveys within one half mile of each alternative site. Historic maps showing the shoreline in the nineteenth century were also provided. These maps were used to determine whether each alternative site is located on fill placed in what was formerly a part of San Francisco Bay in prehistoric times. Where this is the case, there is a low potential for prehistoric archaeological sites. However, it is possible that sites dating to the Early Holocene could have been occupied in these areas when sea level was lower. There is also the potential for buried nineteenth century shipwrecks. Such ships could have sunk in the bay and then been covered with fill.

#### **ALT-A**

The ALT-A site is on fill placed in the bay. Thus, the potential for prehistoric sites is low. This property has been covered by two previous surveys (Praetzellis, et al., 1994; Hupman and Chavez, 1995). No cultural resources were identified as a result of either survey. One prehistoric site, CA-SFR-15, has been recorded within one-half mile of the property. This site was located just inland from the original shoreline overlooking the Islais Creek estuary system.



### **ALT-B**

The ALT-B site near 3Com Park is also on fill placed in the bay and has a low potential for prehistoric sites. No cultural resources were identified on the property as a result of a previous survey (Hupman and Chavez, 1997). There are six prehistoric shellmounds recorded within one-half mile of the property. However, all of these are on, or just inland, of the original shoreline.

### **ALT-C**

The ALT-C site in Brisbane is on or near the original shoreline, so there is a potential for encountering prehistoric sites. The property has not been previously surveyed for cultural resources. Two prehistoric sites are located along the original shoreline within one-half mile of the property. One of these (P-41-000496) is located within 1,000 feet of the property and contains human remains. In addition, one historical resource (CA-SMA-326H), the foundations of a historic period dairy barn, is located within one-half mile of the property.

### **ALT-D**

The ALT-D site near Point San Bruno is on fill placed in the bay and has a low potential for prehistoric sites. No cultural resources surveys have been performed within one-half mile of the property and no prehistoric cultural resources have been identified within one-half mile of the property. One historic building, the W. P. Fuller and Company Paint Plant at 450 East Grand Avenue, has been identified near the property. The structure was originally constructed in 1898 and has been evaluated as “may become eligible for the National Register of Historic Places as a separate property” (NRHP Status Code 4S) (Office of Historic Preservation, 2001). This usually means that not enough research has been completed to make a formal determination. Although this structure would not be physically affected by construction of a power plant nearby, the integrity of its setting could be altered by power plant construction.

### **ALT-E**

The ALT-E site at San Francisco Airport was originally marsh and tidal channels and has a low potential for prehistoric sites. No cultural resources were identified on the property as a result of a previous survey (McKale and Gillies, 2000). No cultural resources have been recorded within one-half mile of the property.

### **Conclusion**

There is a low potential for prehistoric cultural resources to be encountered at Alternative Sites A, B, D, and E since these properties were originally part of San Francisco Bay, now covered by fill. However, as previously noted, there is a possibility that prehistoric sites dating to the Early Holocene or nineteenth century shipwrecks could exist in these locations. There is a greater potential for a prehistoric site to occur at Alternative Site C, located near the original shoreline. A prehistoric site with human burials is recorded within 1,000 feet of Alternative C. Alternative D has the potential to alter the setting of an NRHP eligible structure, the Fuller Paint Plant, built in 1898.

Thus, of the five alternative sites, Alternatives A, B, and E have little potential to affect cultural resources, while Alternatives C and D have a greater potential to affect cultural resources.

The proposed project at Potrero has the potential to affect buried historic resources and will result in the demolition of NRHP eligible structures. Compared with the proposed project at Potrero, Alternatives A, B, and E have less potential to affect cultural resources. Alternatives C and D could have similar or somewhat less potential to affect cultural resources compared to the proposed project at Potrero. A better assessment of the potential to affect cultural resources at Alternatives C and D would require field surveys and historical research.

## **GEOLOGICAL AND PALEONTOLOGICAL RESOURCES**

**Neal Mace**

### **Introduction**

The purpose of staff's alternatives analysis is to assess alternatives that could feasibly attain the project's objectives and avoid or substantially lessen one or more of the significant effects of the project. The analysis also identifies and compares the impacts of the various alternatives but in less detail than the proposed project.

The Commission staff concluded that strong ground shaking and liquefaction potential at the Potrero Power Plant site comprise adverse impacts that can be mitigated by compliance with the applicable LORS and that the proposed project should have no adverse impacts with respect to geological and paleontological resources. Based on the staff's general assessment, each of the alternative sites is also subject to similar ground shaking and liquefaction hazards.

### **Environmental Evaluation Of Alternative Sites**

For the purposes of this analysis, the elements of the project located within the boundaries of the primary site location are considered to be the same for all five alternative sites.

#### **ALT-A**

ALT-A is located southeast of the intersection of Cargo Way and Amador Street, approximately 500 feet south of Islais Creek. ALT-A is located on land reclaimed from San Francisco Bay by the placement of fill in the Islais Creek Basin. The fill typically consists of debris and construction rubble with pieces of wood and timber and is between 20 and 40 feet thick beneath the site.

The Younger Bay Mud underlies the fill. The Younger Bay Mud comprises soft, organic-rich, saturated clay. Borings conducted for the Geotechnical Evaluation, San Francisco Energy Project, Port Site (1994) indicate that the thickness of the Younger Bay Mud beneath the site varies 36.5 feet to 60.7 feet. Bay-Side Sand and Older Bay Mud underlie the Younger Bay Mud. As a result, deep pile foundations would be required for significant structures throughout the site.

The Seismic Shaking Hazard Map of California (CDMG, 1999) indicates there is a 10 percent probability that the site will be subjected to a peak ground acceleration of 0.5 to 0.6g in the next 50 years. The site is located within a liquefaction hazard zone (CDMG, 2000). No active faults are known to cross the site.

No significant paleontological resource locations and no geological resources are known to exist at the site.

### **ALT-B**

ALT-B is located east of Arelious Walker Drive and north of Gilman Avenue, approximately 1000 feet southwest of the South Basin. ALT-B is located on land reclaimed from San Francisco Bay by the placement of artificial fill in the south basin. The fill probably consists of debris and construction rubble. The fill is believed to be underlain by variable thickness of Younger Bay Mud and Bay-Side Sand. Pile foundations would likely be required throughout the site.

The Seismic Shaking Hazard Map of California (CDMG, 1999) indicates there is a 10 percent probability that the site will be subjected to a peak ground acceleration of 0.5g to 0.6g in the next 50 years. The site is located within a liquefaction hazard zone (CDMG, 2000). No active faults are known to cross the site.

No significant paleontological resource locations and no geological resources are known to exist at the site.

### **ALT-C**

This site is located in the City of Brisbane between Bayshore Boulevard and Highway 101, immediately northeast of the intersection of Bayshore and Geneva Boulevard. The site overlies land created when the tidal flats and marshes along the margin of San Francisco Bay were reclaimed by the placement of fill. The fill probably consists of debris and construction rubble and is believed to be underlain by variable thickness of Younger Bay Mud and Bay-Side Sand. Pile foundations would likely be required throughout the site.

The Seismic Shaking Hazard Map of California (CDMG, 1999) indicates there is a 10 percent probability that the site will be subjected to a peak ground acceleration of 0.6 to 0.7g in the next 50 years. Seismic Hazard Maps have not been completed for San Mateo County, however, the site overlies materials that have been mapped as liquefaction hazard zones on the Seismic Hazard Maps for the City and County of San Francisco. No active faults are known to cross the site.

No significant paleontological resource locations and no geological resources are known to exist at the site.

### **ALT-D**

This site is located in on the southern margin of Point San Bruno immediately adjacent to the South San Francisco Recycling Facility. The southern margin of Point San Bruno was reclaimed from San Francisco Bay by the placement of fill. The fill probably consists of debris and construction rubble and is believed to be underlain by variable

thickness of Younger Bay Mud and Bay-Side Sand, with the bedrock that forms Point San Bruno at relatively shallow depths along the northern margin of the site. Pile foundations would likely be required throughout at least a portion of the site.

The Seismic Shaking Hazard Map of California (CDMG, 1999) indicates there is a 10 percent probability that the site will be subjected to a peak ground acceleration of 0.6g to 0.7g in the next 50 years. Seismic Hazard Maps have not been completed for San Mateo County; however, the site overlies materials that have been mapped as liquefaction hazard zones on the Seismic Hazard Maps for the City and County of San Francisco. No active faults are known to cross the site.

No significant paleontological resource locations and no geological resources are known to exist at the site.

### **ALT-E**

This site is located at the northern end of the San Francisco Airport facility, adjacent to United Airlines' cogeneration plant. The site overlies land created when the tidal flats and marshes along the margin of San Francisco Bay were reclaimed by the placement of fill. A bedrock knob is present in the subsurface, immediately west of the ALT-E site. The fill probably consists of debris and construction rubble and is believed to be underlain by variable thickness of Younger Bay Mud and Bay-Side Sand, with bedrock at relatively shallow depths along the western margin of the site. Pile foundations would likely be required throughout most of the site.

The Seismic Shaking Hazard Map of California (CDMG, 1999) indicates there is a 10 percent probability that the site will be subjected to a peak ground acceleration of 0.6g to 0.7g in the next 50 years. Seismic Hazard Maps have not been completed for San Mateo County; however, the site overlies materials that have been mapped as liquefaction hazard zones on the Seismic Hazard Maps for the City and County of San Francisco. No faults are known to cross the site.

No significant paleontological resource locations and no geological resources are known to exist at the site.

### **Comparison of Staff Alternative Sites and the Proposed Site**

Neither the proposed project nor any of the five alternative sites are expected to cause significant impacts in regard to geology, paleontology, and hydrology. **ALTERNATIVES Table A2** shows staff's assessment of the expected seismic hazards for the proposed project and of use of staff's alternative sites. None of the alternative sites offers any significant advantage with respect to seismic hazards, when compared to the proposed project.

**ALTERNATIVES Table A2**  
**Seismic Setting**

<b>Sites</b>	<b>Distance to San Andreas Fault (km)</b>	<b>Peak Ground Acceleration (g)<sup>1</sup></b>	<b>Fault Rupture Hazard</b>	<b>Liquefaction Hazard<sup>2</sup></b>
Potrero Power Plant	13.6	0.5 – 0.6	No known active fault	Only east half and southwest corner of site
Alternative A	12.2	0.5 – 0.6	No known active fault	Entire Site
Alternative B	10.4	0.5 – 0.6	No known active fault	Entire Site
Alternative C	8.2	0.6 – 0.7	No known active fault	Entire Site <sup>2</sup>
Alternative D	6.0	0.6 – 0.7	No known active fault	Most of site <sup>2</sup>
Alternative E	4.8	0.6 – 0.7	No known active fault	Most of site <sup>2</sup>

<sup>1</sup> From CDMG Map Sheet 48, Seismic Shaking Hazard Maps of California (10% Probability in 50 Years)

<sup>2</sup> Liquefaction hazard evaluation for Proposed Project and Alternatives A and B are based on the Seismic Hazard Zone Map for the City and County of San Francisco (CDMG, 2000). An equivalent map for San Mateo County does not exist; however Bay deposits are present beneath these sites and these deposits are classified as potentially liquefiable elsewhere.

## **LAND USE**

**Jon Davidson**

### **ALT-A Cargo Way, San Francisco**

ALT-A is located at the southwest corner of Cargo Way at Amador Street on land owned by the Port of San Francisco. The site is presently undeveloped and is adjacent to and south of the old Continental Grain Terminal. To the east is the Intermodal Container Transfer Facility. To the south of the site is the India Basin Industrial Park. To the west is vacant land that is generally used for storage. The immediate vicinity of the site includes the grain terminal, the maritime industrial facilities of the Port of San Francisco's North and South Container Terminals, and Intermodal Container Transfer Facility. Across Cargo Way to the southwest is a U.S. Postal Service mail processing center and number of industrial warehouses. Other land uses in the project vicinity include the industrial and commercial development along 3<sup>rd</sup> Street to the west of the site and the large communications tower to the east of the site. Generally, this site and its immediate vicinity are located in a major industrial area of the City, with heavy industrial uses predominating.

According to the City and County of San Francisco, this site is zoned M-2, Heavy Industrial, with a maximum structure height restriction of 40 feet. This site is reserved for maritime support uses. The Seaport Plan does not consider the proposed power a maritime use. However, the Port of San Francisco in its Waterfront Land Use Plan has declared this site as surplus to maritime needs and recommends changing its designation to allow specified non-maritime uses. On January 10, 1995, the Seaport Plan Advisory Committee issued a set of proposed amendments to the Seaport Plan that would result in the removal of 22 acres from the maritime use restrictions established in the Seaport Plan. This acreage is enough to accommodate power-

generating facilities without adversely impacting existing and future maritime uses in this area (SFECSA, June 1995).

Development of the proposed project at this site would have similar impacts to those experienced at the proposed Potrero Unit 7 project site, because the general land use character of the area is industrial (zoned M-2, Heavy Industry) in nature. Development of power generating facilities at this site would not physically divide an established community and would be consistent with the requirements of applicable plans and policies. Although the power generation and exhaust stacks exceed the 40-foot height restriction of the M-2 designation, structures and equipment necessary for industrial operations are exempt under the provisions of the City's zoning code. Similar to the proposed Potrero site, this site meets the requirements of the industrial zoning district and is exempt from the height standard. Therefore, development of power plant facilities at this site would be similar to the proposed project.

### **ALT-B Candlestick Park Area, Gilman Site**

ALT-B is located in a level, vacant lot east of Arelious Walker Drive and north of Gilman Avenue, immediately north of 3Com Park. The site is presently used for overflow parking for 3Com Park and has the general appearance of a site that has been abandoned for some time. To the east of the site is the Candlestick RV Park and Candlestick Point State Recreation Area. To the south is 3Com Park with elevated residential areas on the hill slopes to the west of the park. To the immediate west of the site is a gated residential area (Alice Griffith Housing Project) under the jurisdiction of the San Francisco Housing Authority. To the immediate north of the site are Bay wetlands and more residential areas on the southern slopes of Hunters Point. The True Hope Church of God in Christ, the Bret Harte School, and Gilman Park are also located near the site on Gilman Avenue between Hawes Street and Giants Drive. Gilman Park includes playing fields and playground facilities.

This site is located in a sub area of the South Bayshore Area Plan of the San Francisco Master Plan. This sub area is depicted by the Area Plan as strategic in improving land use quality and housing growth and to stimulate long term economic and employment growth in the perimeter of the Candlestick Point State Recreation Area. The General Plan identifies this site as a potential future park. This site and most of the surrounding lands are currently zoned M-1 (Light Industrial). However, with the Candlestick Point State Recreation Area and the existing residential neighborhood as the primary adjacent uses, this area is becoming less suitable for industry and more suitable in the long term for housing or live-work use (South Bayshore Area Plan, July 1995).

According to the South Bayshore Area Plan, the M-1 zoning class prohibits manufacture, refining, distillation of abrasives, acid, alcohol, asbestos and similar hazardous chemicals as well as other heavy industries. This prohibition should be maintained to assure that these areas are adequately protected and insulated from the adverse impacts of toxic industries (South Bayshore Area Plan, July 1995)

In addition, the Alice Griffith Public Housing project is scheduled for improvement of a large tract of vacant land (300,000 square feet) on its property, which is owned by the Housing Authority and zoned for moderate density residential uses. Given these factors, the City seeks to develop this area with a mixture of housing types, including

middle, moderate, and low-income housing that is reflective of the demographic character of the South Bayshore area.

Given that the City seeks to avoid heavy industrial uses in this area, and the existence of several sensitive land uses (i.e., residences, schools, playgrounds, churches, recreation area, etc.) surrounding the site, project development at this site would be less desirable than at the Potrero site. Development of power generating facilities would not be consistent with the City's light industrial designation and would be incompatible with the surrounding residential and recreational uses and the associated sensitive receptors.

In addition, development at this site could raise environmental justice issues. The Alice Griffith Housing Project, a low-income housing land use, is in close proximity to this site and could be disproportionately impacted by the adverse air quality, noise, and hazardous materials impacts of the proposed project. Specific demographic data for project development at this site would have to be evaluated to determine the potential for significant and disproportionate land use impacts on minority and/or low-income populations. However, given observations made during field reconnaissance of the site and surroundings, this area has a higher potential for disturbances to sensitive land uses than the Potrero site.

### **ALT-C Tuntex Site, City of Brisbane**

ALT-C site is located east of the intersection of Bayshore Boulevard and Geneva Boulevard, in the center of Visitation Valley, within an area of the City of Brisbane known as the Baylands planning area. The site is located directly across from Martin Substation on a level, vacant parcel that previously served as a rail freight yard. Public infrastructure (i.e., water, sewer, access, etc.) is non-existent at this site. The portion of the site located north of Geneva Boulevard has undergone remediation for heavy metals. In addition, vacant lands located immediately to the south of the site are currently contaminated with hydrocarbons. To the northwest of the site are non-operating commercial/industrial facilities including the old Pacific Lithograph Printing Company. To the east of site are industrial facilities including resource recovery operations. To the west of the site are commercial and service commercial uses along Bayshore Boulevard and Geneva Avenue. Also, the Cow Palace is located within the site's vicinity. The land use character of the area can be described as predominantly industrial due to the existing electric transmission infrastructure (i.e., Martin Substation) south of the site and the adjacent and nearby light-industrial and heavy industrial uses. However, it should be noted that numerous single-family residences and two elementary schools are located in Daly City to the west in the vicinity of this site.

This site is zoned C-1, which allows mixed-use and commercial development. The site's current zoning reflects a zone change to convert the site's historic M-1 industrial designation. The Brisbane General Plan designates the area as Trade Commercial Planned Development (PD/TC). Currently, general development guidelines do not support the location of heavy industrial uses in the area, or at this site. Therefore, a General Plan amendment and a zone change would be required to accommodate the siting of a power generating facilities at this site. From a land use perspective, this inconsistency with applicable plans and policies constitutes a greater impact than would

be experienced at the Potrero site, since project development at that site is consistent with the site's land use and zoning designations.

### **ALT-D South San Francisco, East Jamie Court**

ALT-D site is located in the City of South San Francisco south of East Jamie Court and east of Haskins Way, in the industrial park area south of East Grand Avenue. The site is located on a level, vacant parcel that appears to be partially used for equipment storage. To the immediate north of the site is a Yellow Freight Systems facility. To the east of the site are industrial facilities including a recycling center. To the south are Bay wetlands while west of the site is an industrial park development. Also, at a higher elevation and within the vicinity of the site, are the office buildings to the north known as "The Courtyard" at 383/393 East Grand Avenue and the Hilltop Business Center on Grandview Drive. The nearby industrial and light industrial uses represent the general land use character of this area.

According to the South San Francisco General Plan, this site is within an area designated as Mixed Industrial and Coastal Commercial with a 161-foot height limit for structures according to the General Plan's Airport Related Height Limitations. The Mixed Industrial designation is intended to provide and protect industrial lands for a wide range of manufacturing, industrial processing, general service, warehousing, storage and distribution, and service commercial uses. Industries producing substantial amounts of hazardous waste or odor and other pollutants are not permitted under the Mixed Industrial designation. The Coastal Commercial designation allows for a variety of office, limited retail, and other low-scale commercial uses with a coastal orientation (South San Francisco General Plan, 1999).

Project development at this site would have similar impacts to those experienced at the proposed Potrero project site due to the heavy industrial land use character of the area. Development of power generating facilities at this site would not physically divide an established community. The power generation and exhaust stacks would exceed the 161-foot height restriction of the South San Francisco General Plan's Airport Height Limitations. Therefore, a General Plan amendment or reduction in stack heights to meet this restriction would be required. From a land use perspective, this inconsistency with the General Plan would constitute a greater impact than the proposed Potrero site, since that site is exempt from height restrictions of the San Francisco General Plan due to its Heavy Industry land use designation.

### **ALT-E SF Airport, United Golden Gate (UGG) Site**

ALT-E site is a surface lot used for United Airlines employee parking. The site is located south of North Access Road adjacent to the United Airlines cogeneration plant and maintenance facilities. To the east, south, and west of the site are airport facilities. To the north of the site are additional airport facilities, shoreline wetlands, the Safe Harbor Homeless Shelter (located approximately 500 feet from the site), and the County of San Mateo Transit Bus Yard. Immediately west of the homeless shelter and adjacent to the shoreline wetlands is a picnic area with two picnic benches and a walking trail. The west side of the shoreline wetlands include several large storage tanks used for jet fuel storage, and silos containing the City of South San Francisco's sewage discharges. Generally, the land use character of this area is predominantly industrial due to the adjacent maintenance, fueling, and cogeneration facilities.



This site is designated Mixed Industrial by the South San Francisco General Plan with a 161-foot height limit for structures according to the General Plan's Airport Related Height Limitations. This designation is intended to provide and protect industrial lands for a wide range of manufacturing, industrial processing, general service, warehousing, storage and distribution, and service commercial uses (South San Francisco General Plan, 1999). Industries producing substantial amounts of hazardous waste or odor and other pollutants are not permitted under the Mixed Industrial designation.

Development at this site may have potentially adverse air quality, noise, and hazardous materials impacts on the Safe Harbor Homeless Shelter, a sensitive receptor. Although this homeless shelter is located in a heavy industrial area and is likely affected by the existing surrounding industrial uses, development of power generating facilities at this site may exacerbate impacts on this sensitive land use. In general, given observations made during field reconnaissance of the site and surroundings, this area has a higher potential for disturbances to sensitive land uses than the Potrero site. However, development of power generating facilities at this site would not physically divide an established community.

In addition, similar to ALT-D, the power generation and exhaust stacks exceed the 161-foot height restriction of the South San Francisco General Plan's Airport Height Limitations. Therefore, a General Plan amendment or reduction in stack heights to meet this restriction would be required. From a land use perspective, this inconsistency with the General Plan would constitute a greater impact than the proposed Potrero site, since that site is exempt from height restrictions of the San Francisco General Plan due to its Heavy Industry land use designation.

## **NOISE**

**Jim Buntin**

### **Summary of Proposed Project Impacts**

It is technically and, typically, economically feasible to mitigate power plant noise impacts to a level of insignificance. The chief factor in determining the cost, and thus the feasibility, of this mitigation is the distance to the nearest sensitive noise receptor.<sup>4</sup> The nearest receptors to the proposed project site are residences near 22<sup>nd</sup> Street, and in the Potrero Hill neighborhood west of Interstate 280. With the exception of the Potrero Hill residences, multi-story industrial buildings interrupt line of sight to the nearest residences. The proposed project would mitigate noise emissions to a level of insignificance at these residences.

### **Laws, Ordinances, Regulations, and Standards**

Any federal, state, and City and County of San Francisco LORS pertaining to noise will apply to ALT-A and ALT-B. Please refer to the **Noise** section for a description of these requirements.

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<sup>4</sup> Sensitive receptors include residences, schools, libraries, hospitals, places of worship, and any other uses for which quiet is important.

ALT-C lies within the City of Brisbane. Applicable LORS are the Noise Element of the City of Brisbane General Plan (adopted June 21, 1994), and Chapter 8.28 of the City of Brisbane Municipal Code (adopted in December 1987).

- The City of Brisbane General Plan Noise Element requires a noise attenuation or mitigation program as part of any project design, and restricts noise-producing construction activities to daytime hours.
- Chapter 8.28 of the City of Brisbane Municipal Code prohibits noise levels more than 10 dBA above the ambient noise level for a cumulative period of 15 minutes per hour, or more than 20 dBA above the ambient noise level for a cumulative period of 3 minutes per hour. This chapter exempts construction noise from the above standards during the hours of 7:00 a.m. to 7:00 p.m. weekdays, and between 9:00 a.m. and 7:00 p.m. weekends and holidays. It also limits construction noise during those hours to 86 dBA at the nearest property line.

ALT-D is located in the City of South San Francisco, and ALT-E is in South San Francisco but within the jurisdiction of the San Francisco International Airport.

### **Land Uses Near Alternative Sites**

ALT-A is an alternative presented in the Mirant AFC. The site is in an industrial area, and would not be likely to affect existing noise sensitive uses. However, the introduction of the power plant could, by virtue of noise generation, affect the feasibility of future development of nearby properties for public uses.

ALT-B is vacant land currently used as parking for 3Com Park. It is identified as a potential park site by the City/County General Plan, and is adjacent to undeveloped park property. The site is in an industrial area, and would not be likely to affect existing noise sensitive uses. However, the introduction of the power plant could, by virtue of noise generation, affect the feasibility of future development of the adjacent site for public uses.

ALT-C is in an industrial area, adjacent to a major roadway and the railroad tracks. There are no nearby existing noise sensitive uses. The zoning of the site is C-1, which could either eliminate the possibility of introducing an industrial use, or, if the land is permitted to be used as a power plant site, affect the feasibility of future development of adjacent properties for mixed uses.

ALT-D is adjacent to the City of South San Francisco recycling facility, and is in an industrial area. There are no nearby existing noise sensitive uses.

ALT-E is adjacent to the United Airlines cogeneration plant and a recently approved peaking power generation plant. The nearest sensitive noise receptors are about 500 feet away, at a homeless shelter. The overall area is impacted by noise from aircraft operations at San Francisco International Airport.

### **Construction Noise Impacts**

Noise levels due to construction at the alternative sites will have to comply with applicable limits in accordance with the LORS. Staff therefore expects that construction

at any of these sites will result in neither more nor less community or worker noise impacts than at the proposed project site.

### **Plant Operation Noise Impacts**

Noise levels due to plant operations at any of the alternative sites will have to comply with applicable limits in accordance with the LORS. Staff therefore expects that plant operations at any of these sites will result in neither more nor less community or worker noise impacts than at the proposed project site.

### **Summary**

Alternative sites ALT-A through ALT-D do not appear to pose the potential to result in noise impacts. At ALT-E, there is the possibility of affecting residents of the nearby homeless shelter. Mitigating project noise emissions to a level of insignificance at ALT-E would probably be more costly than at the proposed site due to the proximity of the shelter.

After mitigation, no significant adverse noise impacts are expected at either the proposed site or any of the alternative sites.

## **HAZARDOUS MATERIALS MANAGEMENT**

**Alvin Greenberg, Ph.D.**

### **Analysis**

This analysis discusses the implications of locating the proposed Potrero Power Plant Unit 7 Project at various alternative sites with respect to hazardous materials management. Hazardous materials would be used during facility construction and operation.

### **Construction**

During the construction phase of the project, the only hazardous materials proposed for use include phosphate or nitrate cleaning solutions, cleaning solvents, antifreeze, and pesticides. Any impact of spills or other releases of these materials will be limited to the site due to the small quantities involved. As long as the design of the project does not change significantly, the types and quantities of hazardous materials used during construction of the facility would not vary among sites.

### **Operation**

In general, the identity, amount, handling, and storage of hazardous materials during facility operations is a function of facility design and not the location of the site. Therefore, the choice of an alternative site will not affect hazardous materials usage during operations. However, the impacts of an accidental release may be different at different sites due to the location and density of residential and commercial development in the area. Additionally, hazardous material transportation routes may differ and thus may have a different potential for impacts in the community.

Accordingly, staff qualitatively evaluated each alternative site in terms of its level of impacts, which could be expected if an accident occurred involving either an on-site

hazardous material spill or an off-site transportation accident resulting in a hazardous material spill.

For example, the area surrounding a proposed facility in which a person residing, working, or traveling through might experience exposure at a level where they could become injured by a chemical spill is termed the Vulnerability Zone (VZ). For the storage of aqueous ammonia at the proposed Potrero Power Plant Unit 7 Project, the VZ is approximately 162 feet from the aqueous ammonia storage tanks when the proposed spill containment methods are used. This distance is not site specific but rather is general for the type of facility and the methods of use, handling and spill containment proposed by the applicant. Thus, they would be the same for any of the alternative sites listed. Because the VZ does not reach beyond the facility fence line, no off-site impacts would be expected to occur at any alternative site as a result of an on-site accidental release of aqueous ammonia. Because staff has determined that the greatest potential for an accidental release of hazardous materials involves the release of aqueous ammonia, the risk of off-site impacts from the accidental release of any other hazardous material stored on-site is even lower.

The transportation of hazardous materials over city streets to the facility presents a potential for impacts if an accident and spill occurs. Staff's analysis found that this potential could be mitigated to a level of insignificance. However, in comparing alternative sites, those that require substantial hazardous materials travel through a residential or commercial community present a greater potential for impacts than those sites where travel would be primarily through industrial areas.

The assessment of the potential for impacts on people at each alternative sight was compared qualitatively to the potential for impacts at the preferred site by indicating if the alternative site would be the same, inferior, or superior to the preferred site.

Site ALT-A on Cargo Way, San Francisco, is a 5-acre vacant lot owned by the Port of San Francisco. The distance to the nearest residence is 5-6 blocks. The hazardous materials transportation route would consist of approximately 2 miles from Highway 101 (a little less if the transport vehicle exits from Interstate 280) mostly through commercial and industrial areas but with some residences along the route. This site is deemed inferior to the proposed site due to the proximity of homes to the transportation route.

Site ALT-B is located on Gilman St. in San Francisco across from 3-Com Park. It is presently vacant and used for parking during professional football games. Homes are located 2 blocks to the west and an RV storage area borders the site on the east. The transportation route from Highway 101 is either 1.2 miles from the northwest via 3<sup>rd</sup> Street and Gilman Ave. or 1.8 miles from the southwest via Harney Way, Jamestown Ave., and Hunters Point Expressway, and then into Gilman for about 3 blocks. Third Street is heavily commercial and Gilman is totally residential. Harney Way is mostly bay-front and commercial but with one notable large condominium complex. Jamestown Ave., the Hunters Point Expressway, and most of the Gilman Ave. route into the facility is bordered by bay-front, park, or 3-Com Park parking lots. This site is deemed inferior to the proposed site due the proximity of homes to the facility site and to the transportation route.

Site ALT-C is located on a vacant portion of a parcel in the City of Brisbane. Residences are located 2-3 blocks to the west across Bayshore Blvd. The transportation route from Highway 101 would be through industrial, commercial, or open spaces areas. This site is deemed equal to the proposed site due the lack of proximity to homes to the site and to the transportation route.

Site ALT-D is a flat, vacant site located in a general industrial area in South San Francisco. It is adjacent to SF Bay and to a recycling operation. A home is located a little over ½ mile to the north. The transportation route would be ~1.6 miles from Highway 101 through industrial and commercial areas. This site is deemed equal to the proposed site due the lack of proximity of homes to the site and to the transportation route.

Site ALT-E is located at the north end of San Francisco Airport, on the North Access Road adjacent to the United Airlines Cogeneration plant. The nearest residence is 10 blocks away but the Safe Harbor homeless shelter is located 500 feet to the north across the North Access Road. Also located there is the SamTrans bus storage lot and some administrative buildings. The transportation route would be approximately ½ mile from Highway 101/Interstate 380 continuation off-ramp to the North Access Road. The North Access Road is bordered on the south by an industrial area (United Airlines facility) and open space/wetlands to the north. From the perspective of hazardous materials, this site is deemed superior to the proposed site due the lack of proximity of homes to the site and the transportation route.

## **Summary**

Staff has concluded in the **Hazardous Materials Management** section of the Staff Assessment that the proposed project would not be likely to cause any significant adverse impacts from hazardous materials use, storage, or transportation.

The quantity and types of hazardous materials due to project operation would not differ between the alternative sites and the proposed site. Minor differences exist in proximity of residences to the sites and residences along the likely transportation route.

Staff concludes, that using the above qualitative approach, Alternative Sites A and B are inferior to the proposed site due the proximity of homes to the facility site and to the transportation route. Staff finds that Alternative Sites C and D are equal to the proposed site due the lack of proximity of homes to the site and to the transportation route. Staff also finds that Alternative Site E is superior to the proposed site, from the perspective of hazardous materials, due the lack of proximity of homes to the site and the transportation route.

## **SOCIOECONOMICS**

**Michael Fajans and Amanda Stennick**

### **Purpose of the Analysis**

The purpose of this analysis is to compare alternative sites to the Applicant's Potrero Power Plant site in terms of expected socioeconomic impacts. Please refer to the

**Socioeconomics** section of this document, which evaluates the likely socioeconomic impacts from the use of the Potrero Power Plant site.

This alternative site analysis did not evaluate consistency with applicable LORS because this was a screening level socioeconomic analysis.

### **Project and Alternative Sites Evaluation**

Five alternative sites have been considered. Each of the sites would require the same construction labor force and would draw from the same labor supply. As with the proposed project, the employment, housing, and schools impacts of the construction and permanent labor force would not be significant because of the size of the Bay Area economy.

#### **ALT-A Cargo Way, San Francisco**

Impacts on neighborhoods would be comparable to the proposed project, with housing located 5-6 blocks from the site. However, development at this site would require an additional site dedicated to power generation, a site that could not be used for economic uses that might generate more jobs in a district of San Francisco in great need for more employment opportunities. Impacts on utilities, emergency services, and public finance would be comparable, as the service agencies would be the same.

Relative to the project site, the closest neighborhoods are lower income and higher proportion minority, and there is a significant population subject to environmental justice concerns.

#### **ALT-B Gilman Site, San Francisco**

Impacts on neighborhoods would be greater than that of the proposed project, with housing located within two blocks of the site. Development at this site would require an additional site dedicated to power generation, a site that could not be used for the park purpose for which it is designated. As a low income, minority community, a change in future land use from park to power plant would be a significant adverse impact on the neighborhood. Impacts on utilities, emergency services, and public finance would be comparable, as the service agencies would be the same.

Relative to the project site, the closest neighborhoods are lower income and higher proportion minority, and there is a significant population subject to environmental justice concerns.

#### **ALT-C Tuntex Site, City of Brisbane**

Impacts on neighborhoods would be greater than that of the proposed project, with housing located within two blocks of the site. Development of a power plant at this site would require a change from an area zoned for job producing commercial uses. To an adjacent low income, minority community, a change in future land use from commercial to power plant would represent a significant adverse impact on the neighborhood. Utility, emergency services, and public finance impacts would be somewhat comparable, although the service agencies would differ in some cases. As a smaller city, Brisbane would receive greater relative property tax benefits from the project.

Relative to the project site, the closest neighborhoods are lower income and higher proportion minority, and there is a significant population subject to environmental justice concerns.

#### **ALT-D East Jamie Court, City of South San Francisco**

Impacts on neighborhoods would be less than the proposed project, with no housing located within a half mile of the site. Development at this site would require an additional site dedicated to power generation, but is located adjacent to a municipal recycling facility and other industrial uses. Impacts on utilities, emergency services, and public finance would be comparable, although the service agencies would be different than in San Francisco.

Relative to the project site, neighborhoods are farther away and do not have the proportion of low income and minority population.

#### **ALT-E San Francisco International Airport, United Golden Gate Site**

Impacts on neighborhoods would be less than the proposed project, with no housing located within 10 blocks of the site (with the exception of a homeless shelter 500 feet north). Development at this site would be adjacent to the United Airlines Cogeneration Plant and a recently approved 51 MW peaker plant. Impacts on utilities, emergency services, and public finance would be comparable, although the service agencies would be different than in San Francisco.

Relative to the project site, neighborhoods are farther away and do not have the proportion of low income and minority population.

### **Conclusion**

In the area of Socioeconomics, staff has concluded that the proposed project will not result in any significant adverse socioeconomic impacts if it is located at the Potrero site. Consequently, in the area of Socioeconomics, there is no reason to locate the project at an alternative site since there are no significant adverse socioeconomic impacts to reduce or eliminate. Locating the project at ALT-B (the Gilman site in San Francisco) or ALT-C (the Tuntex site in Brisbane) would quite possibly result in significant adverse socioeconomic impacts because of neighborhood proximity and taking sites proposed for neighborhood serving recreational and retail commercial needs, respectively.

**ALTERNATIVES Table A3**  
**Summary of Alternative Sites for Socioeconomic Resources**

<b>Alternative Sites</b>	<b>Comparison with Potrero Site</b>
ALT-A: Cargo Way	Greater impacts
ALT-B: Gilman Site	Greater impacts
ALT-C: Tuntex Site	Greater impacts
ALT-D: East Jamie Court Site	Lesser impacts
ALT-E: SF Int'l. Airport Site	Lesser impacts

## **SOIL AND WATER RESOURCES**

**Joe Crea, Dominique Brocard, Jim Henneforth**

### **Purpose of the Analysis**

The purpose of this analysis is to compare five (5) alternative sites analyzed by the Energy Commission staff to Mirant's proposed site at the Potrero Power Plant. The Potrero Power Plant is located east of Illinois Street between 22<sup>nd</sup> Street and 23<sup>rd</sup> Street. This analysis is on the basis of impacts to soil and water resources. Please refer to the **Soil and Water Resources** section of this Final Staff Assessment, which evaluates the impacts to soil and water resources from the use of the existing Potrero Power Plant site.

### **Applicable Laws, Ordinances, Regulations, And Standards (LORS)**

Any federal, state, and local LORS pertaining to soil and water resources would apply to Alternative sites ALT-A and ALT-B. ALT-C is located in the City of Brisbane, San Mateo County; ALT-D is located in the City of South San Francisco, San Mateo County; and ALT-E is located at the property of the San Francisco International Airport (SFIA).

According to Tim Tune (Senior Planner for the City of Brisbane), ALT-C will need to obtain a grading permit via the Public Works Department. Site drainage is covered under this permit. Mr. Tune also mentioned that because ALT-C is located in the vicinity of a nearby landfill, the County of San Mateo might have provisions related to earthmoving.

Richard Harmon (City of South San Francisco Public Works Department, Engineering Division) indicated that ALT-D would need a grading permit. The grading permit is modeled after the California Uniform Building Code.

Mr. Harmon indicated that the Water Quality Control Division would require a copy of the Applicant's Storm Water Pollution Prevention Plan (SWPPP) as part of the overall NPDES program. The Standard Urban Storm Water Mitigation Plan (SUSMP) is part of the overall National Pollutant Discharge Elimination System (NPDES) Stormwater program that is administered by the Regional Water Quality Control Board (RWQCB). The RWQCB requires all cities to update existing stormwater programs in an effort to update existing legal authority to enforce the SUSMP provisions of the permit. The permit for the ALT-D is considered a joint permit, with the County of San Mateo as the Principal Permittee and the City of South San Francisco as the Permittee. This area-wide NPDES municipal stormwater permit is designed to attain water quality objectives and protect the beneficial uses of receiving waters.



The SUSMP is part of the municipal stormwater program that serves as a model for the City of South San Francisco to address stormwater pollution from new development and redevelopment projects. All persons engaging in earthmoving activities are required to demonstrate proof of compliance regarding Stormwater discharge requirements mandated by the RWQCB. The City of South San Francisco is to ensure that Best Management Practices (BMPs) are implemented to reduce pollution from stormwater runoff during pre and post construction activities.

ALT-E would be located on San Francisco International Airport property and therefore subject to the San Francisco International Airport Tenant Improvement Guide. The guide provides provisions, regulations and procedures related to discharge. Provisions for grading operations contain Articles that state a permit must be obtained prior to the commencement of work, which may be part of the General Tenant Permit request.

In the event that potential contaminated soils/groundwater be encountered at ALT-C, ALT-D, and ALT-E sites, the Applicant needs to comply with LORS associated with the County of San Mateo Health Department

### **Summary of Proposed Project Impacts**

The proposed Unit 7 project will require three water systems: plant cooling, process, and domestic uses. Additionally, there will be a waste discharge system for all plant wastewater.

Most of Unit 7's water demands would be required for plant cooling purposes. Assuming the plant utilizes cooling water from the San Francisco Bay there will be a requirement of 158,000 gpm. This would require the construction of a new intake structure that would include screens, pumps, piping, as well as a discharge system.

Process and domestic water uses for the project are proposed to be supplied by the local water agency. Process water that would be required for the steam cycle will use treated potable water in the process to create steam in the heat recovery steam generator to drive the steam turbine. There will be make up water required to the steam cycle to replace losses as well as water that is blown down to maintain purity. Potable water will also be used for makeup to the combustion turbine evaporative coolers, equipment wash, and miscellaneous in plant uses. Domestic water for plant personnel and sanitary use will also be required. The process water requirements will have an annual average requirement of 36 gpm, the evaporative coolers 50 gpm during the summer months, and the domestic requirements of 2 gpm.

In addition to the cooling water discharge, wastewater streams will be generated in the plant from blowdown from the heat recovery steam generators, the evaporative coolers, equipment wash water, floor drains, and sanitary wastes. Storm water is also considered a wastewater, which during periods of heavy rains could generate measurable flows. The water treatment system for the process makeup to the heat recovery steam generators would normally have a waste discharge however the applicant has proposed to use vendor supplied units that will regenerate the treatment facilities off site and discharge the wastes under the vendors existing permits.

With the exception of the cooling water, which will be discharged to the San Francisco Bay, the other waste streams will be treated and either discharged to the bay or to the local sewer. The plant will collect waste streams that may contain oil contamination and treat them in an oily-water separator prior to discharge. The oil collected will be trucked to an approved disposal facility. Wastewater from plant equipment wash that may contain heavy metals will be collected and disposed of offsite. The applicant estimates the maximum waste water discharges to be 158,000 gpm to the bay from the cooling water system; 25 gpm to the bay from the evaporative cooler blowdown; 76 gpm to the bay from the heat recovery steam generator blowdown; 81 gpm to offsite disposal from equipment washes; 10 gpm to the sewer from plant drains; 20 gpm to the sewer from sanitary wastes; 500 gpm to the sewer from stormwater runoff; and 270 gpm of treated effluent to the sewer from the oily water separator.

## **Evaluation of Alternative Sites**

### **ALT-A Cargo Way**

The Cargo Way site is located south of Islais Creek Channel between Cargo Way and Amador streets. A new cooling water intake structure and discharge would be required similar to that for the Potrero Unit 7 site. There would be an increased capital and pumping cost for the intake and discharge due to the additional distance that the Cargo Way site is located from the San Francisco Bay. This could potentially be reduced if the cooling water could be drawn from the Islais Creek. The route of the cooling water pipe to the bay would be approximately 2200 feet and to the creek a distance of 200-300 feet. Water for process and domestic uses would be obtained from the City of San Francisco as proposed for the Potrero Unit 7 site. Wastewater would be handled in a similar manner as the proposed site by being discharged to the local sewer.

### **ALT-B Gilman Site**

The Gilman site is located just north of Gilman Avenue and east of Arelious Walker Drive on the Candlestick Point. A new cooling water intake structure and discharge would be required similar to that for the Potrero Unit 7 site. The Gilman Site is located approximately 500 feet from the South Basin of the San Francisco Bay and would therefore require additional capital and increased pumping cost compared to the proposed site location. The cooling water discharge would most likely not be directed to the South Basin, as this would tend to impact the water temperature of the intake due to the confined nature of the basin. Therefore, the discharge would most likely require additional pipe to reach the bay that is located 1,100 to 1,200 feet from the plant site. Water for process and domestic uses would be obtained from the City of San Francisco as proposed for the Potrero Unit 7 site. Wastewater would be handled in a similar manner as the proposed site by being discharged to the local sewer.

### **ALT-C Tuntex Site**

The Tuntex site is located in San Mateo County in the City of Brisbane just Northeast of the intersection of Geneva Avenue and Bayshore Blvd. This alternative is located the furthest from the San Francisco Bay, a distance of approximately 1500 to 1800 feet, making it the site with the greatest impacts associated with the use of the Bay as a source for cooling water. Additionally, to reach the Bay the cooling water pipes must cross three railroad lines and as well as several roadways including Highway 101.

Therefore at this location the use of reclaimed water and cooling towers would likely be considered. At this site, using reclaimed water from wastewater treatment facilities would be preferable to potable water as a source of make up to wet cooling towers. Depending on the quality of the reclaimed water, the requirements of the plant would range between 2.9 and 4.4 million gallons per day (mgd). Effluent or blowdown from the cooling towers would be returned to the wastewater treatment plant either through the sewer system or through a dedicated pipeline. The City and County of San Francisco's Southeast Water Pollution Control Plant would most likely provide reclaimed water. The effluent from the water treatment plant is currently treated to secondary standards and would require further treatment to be used in a cooling tower application. This plant is located about 2.5 miles from the Tuntex Site and would require a new pipeline for delivery of the cooling tower makeup water.

Water for process and domestic uses would be obtained from the City of Brisbane, which acquires its water from the City of San Francisco. Although the additional water requirements for this plant may impact the City's water system, it is assumed that expansion or new waterlines (of approximately two miles in length) could be built to provide for the additional requirements. Wastewater would be handled in a similar manner as the proposed site by being treated and discharged to the local sewer that is operated by the City of San Francisco.

#### **ALT-D East Jamie Court Site**

The East Jamie court Site is located in South San Francisco in Mateo County on the San Francisco Bay south of East Jamie Court and east of Haskins Way. A new cooling water intake structure and discharge would be required similar to that for the Potrero Unit 7 site. Water for process and domestic uses would be obtained from the California Water Company that serves the City of South San Francisco. Wastewater would be handled in a similar manner as the proposed site by being treated and discharged to the local sewer that is operated by the City of South San Francisco.

#### **ALT-E United Golden Gate (UGG) Site**

The UGG site is located near the San Francisco International Airport. It is south of the North Access road. A new cooling water intake structure and discharge would be required similar to that for the Potrero Unit 7 site. The Gilman Site is located approximately 700 to 800 feet from the San Francisco Bay and would therefore require additional capital and increased pumping cost compared to the proposed site location. Water for process and domestic uses would be obtained from the California Water Company that serves the City of South San Francisco. Wastewater would be handled in a similar manner as the proposed site by being treated and discharged to the local sewer that is operated by the City of South San Francisco.

#### **Erosion/Sedimentation and Stormwater**

An erosion and sediment control plan would be needed as part of the Stormwater Pollution Prevention Plan (SWPPP) at any alternative site. This plan would provide mitigation for any potential impacts resulting from erosion. The SWPPP is part of the provisions set forth in the NPDES permit requirements that is required for the construction and operation of the project. Impacts related to erosion and stormwater

would be essentially the same for each of the alternative sites as for the proposed project.

### **Contaminated Soils/Groundwater**

Although soil and groundwater contamination is evident at ALT-C, project development at the other alternative sites may also encounter potential soils/groundwater contamination. The Applicant would need to provide a site analysis and a remediation plan as well as meet any LORS pertaining to state and local agencies prior to the commencement of construction. From a soil and water resource perspective, the remediation of existing contaminated soil and groundwater is a benefit. The Applicant will also need to meet any provisions/permits regarding the handling and disposal of any contaminated materials during construction. For further discussion of site contamination issues, refer to the **Waste Management** and **Public Health** discussions in this Alternatives Section.

### **Summary**

ALT-A (Cargo Way) and ALT-B (Gilman) would be very similar to the proposed project in regard to a power plant's water needs, available water supplies, and wastewater discharge impacts and offer no advantages over the proposed project site.

A power plant at ALT-C (Tuntex), which is further from the Bay, would likely be required to use reclaimed water as cooling tower makeup thereby reducing any impacts on the San Francisco Bay due to the cooling water intakes and discharge. While use of reclaimed water would reduce impacts on aquatic biological resources, the impacts of construction of an approximately two-mile water pipeline would make this site at ALT-C is less desirable in the soils/water discipline than the proposed Unit 7 site.

Site ALT-D (East Jamie Court) and ALT-E (UGG) would both be very similar to the proposed Unit 7 site by using a once through cooling system that intakes and discharges to the San Francisco Bay. The California Water Company would provide other in plant water uses and the wastewater would be discharged to the City of South San Francisco's sewer. Therefore, from the perspective of water use, water supply, and wastewater disposal, sites D and E offer no significant advantage over that of the proposed Unit 7 site.

## **TRAFFIC AND TRANSPORTATION**

### **Jim Fore**

The purpose of this analysis is to compare alternative sites to the Applicant's Potrero Power Plant Unit 7 Project site in terms of expected traffic and transportation impacts.

### **ALT-A Cargo Way, San Francisco**

This site is located on the west side of Cargo Way south of the proposed site. This site would basically use the same freeways and roadways associated with the proposed site. The major difference would be that more of the construction traffic workforce would have to use Third Street to get to the site from either Army Street or Evans Street. The construction traffic associated with this project and the construction associated with the Third Street Light Rail Project could increase traffic congestion on Third Street. Therefore, this site is deemed inferior to the proposed site.

### **ALT-B Gilman Site, San Francisco**

The Gilman site is located across from 3-Com Park on Gilman Street. The access to this site would require the use of Third Street. There are some limits on truck traffic along Third Street in the area of this site. Trucks weighing more than 11,000 pounds are prohibited on Third Street between Evans Avenue and Carroll Avenue and no through trucks are allowed on Third Street between Jamestown Avenue and Jerrold Avenue. The limitation on truck traffic makes this site inferior to the proposed site.

### **ALT-C Tuntex, City of Brisbane**

The Tuntex site is located West of US 101 with Bayshore Boulevard being the primary exit. The site can be accessed from Bayshore Boulevard west of the site or Tunnel Avenue east of the site. The site is located in an industrial area; however, Tunnel Avenue traffic is primarily residential and local commercial. The site is not accessible to port facility and/or direct rail service. Therefore, the site is deemed to be inferior to the proposed site.

### **ALT-D East Jamie Court, City of South San Francisco**

This site is located in an industrial area in South San Francisco adjacent to a recycling operation and San Francisco Bay. The area is a mixture of industrial, commercial and open space. It is approximately 1.5 miles from US 101. Traffic in the site area is predominantly associated with commercial and industry operation. Therefore, the impact of construction traffic may not have a significant impact on local traffic flow. The site is deemed to be equal to the proposed site, from the traffic and transportation perspective.

### **ALT-E United Golden Gate Site, San Francisco International Airport**

This site is located east of US 101. The site is located at the north end of San Francisco Airport, on the North Access Road. It is adjacent to the United Airlines Cogen plant. There is a large long-term parking lot in the area. This area is predominantly industrial with no nearby residential areas. The area has heavy truck activity. The local roadways do have a high level of traffic activity. The area lacks rail service and no port facilities are available.

The site location is in an industrial area with no nearby residential area, although there is a residential shelter nearby. The construction truck activity would have limited impact on the area but the high level of traffic on the local roadways could be disruptive. Given the industrial activity in the area and lack of residential traffic, the site is deemed to be superior to the proposed site, from the traffic and transportation perspective.

## **VISUAL RESOURCES**

**Michael Clayton**

### **Summary**

Staff does not expect the ALT-A, ALT-D, or ALT-E sites to result in significant visual impacts. However, it is anticipated that the ALT-B and ALT-C sites would cause significant and unavoidable adverse visual impacts.

## **ALT-A Cargo Way, San Francisco**

Site ALT-A is located at the southwest corner of Cargo Way at Amador Street on land owned by the Port of San Francisco. The site is presently undeveloped and is adjacent to and south of the old Continental Grain Terminal. To the east is the Intermodal Container Transfer Facility. To the south of the site is the India Basin Industrial Park. To the west is vacant land that is generally used for storage. The landscape in the immediate vicinity of the site is dominated by the grain terminal and to a lesser extent, the maritime industrial facilities of the Port of San Francisco's North and South Container Terminals, and Intermodal Container Transfer Facility. Also visible in views of the project vicinity is the industrial and commercial development along 3<sup>rd</sup> Street to the west of the site and the large communications tower to the east of the site.

The overall visual quality of the immediate project site is low, reflecting the influence of complex industrial appearance of the grain terminal and the maritime industrial and storage uses in the immediate project vicinity. However, the presence of the tall, massive grain terminal with its complex forms and strong vertical lines creates the opportunity for a moderate degree of visual absorption in what would otherwise be an industrial landscape dominated by relatively low, horizontal, geometric structures. Viewer sensitivity is rated moderate and reflects the offsetting values of low viewer sensitivity in the commercial and industrial areas immediately adjacent to the site and high viewer sensitivity for the residential areas south of the site on the north side of Hunters Point and west of the site on the east and south slopes of Potrero Hill. Viewer exposure would be high, reflecting the foreground proximity of the site to the extended viewing opportunities from the higher elevation residential areas of Hunters Point and Potrero Hill and the numerous viewing opportunities along the 3<sup>rd</sup> Street commercial corridor. The project would also be visible to some of the north-facing, upper floors in the India Basin Industrial Park. The resulting overall visual impact susceptibility would be moderate.

Use of the ALT-A site for a power plant would result in the introduction of linear and geometric block forms of industrial character that would be similar to the adjacent industrial facilities such as the grain terminal and the container transfer facility. The resulting visual contrast would be low-to-moderate when viewed from nearby viewing locations and more distant viewpoints of Hunters Point and Potrero Hill. The power plant would be a prominent visual element in the Port of San Francisco's maritime industrial area and would appear co-dominant with the adjacent grain terminal. The power plant would result in a low degree of view blockage of other industrial and commercial uses. The overall severity of the visual impact would be low-to-moderate. In the context of the site's overall moderate visual impact susceptibility, the resulting visual impact would be considered adverse but not significant.

## **ALT-B 3Com Park Area, Gilman Site**

Site ALT-B is located in a level, vacant lot east of Arelious Walker Drive and north of Gilman Avenue, immediately north of 3Com Park. The site is presently used for overflow parking for 3Com Park and has the general appearance of a site that has been abandoned for some time. To the east of the site is the Candlestick RV Park and Candlestick Point State Recreation Area. To the south is 3Com Park with elevated residential areas on the hill slopes to the west of the park. To the immediate west of the

site is a residential area. To the immediate north of the site are Bay wetlands and more residential areas on the southern slopes of Hunters Point. More distant views of the site are afforded to residential areas at higher elevations west of Highway 101.

Overall visual quality is low due to the site's somewhat dilapidated state. Visual absorption capability of the existing landscape is also low given the level terrain and the general absence of large structures in the immediate vicinity of the site north of Gilman Avenue. Viewer sensitivity is high as a result of the close proximity of residences to the southwest, west and north, and visitors to Gilman Park to the south and the State Recreation Area to the east. Viewer exposure would be high given the numerous foreground to middleground viewing opportunities from all directions. The overall susceptibility of the site to significant visual impacts is considered moderate-to-high.

The power plant would introduce a high level of visual contrast into the viewshed given the general absence of comparable structures with similar visual characteristics. The power plant would be the dominant feature in the foreground to middleground landscape while view blockage of wetland and Bay landscapes would be moderate. The severity of the resulting visual impact would be high and the visual impact is considered significant and unavoidable.

### **ALT-C Tuntex Site, City of Brisbane**

The ALT-C site is located immediately northeast of the intersection of Bayshore Boulevard and Geneva Boulevard, in the center of Visitation Valley. The site is located northeast of Martin Substation on a level, vacant parcel. To the north of the site are non-operating commercial/industrial facilities including the old Pacific Lithograph Printing Company. To the east of site are industrial facilities including resource recovery operations. To the south of the site is vacant land that is contaminated with hydrocarbons. To the west of the site are commercial and service commercial uses along Bayshore Boulevard and Geneva Avenue. Also within viewing distance of the site is the Cow Palace event facility.

The existing visual quality in the immediate vicinity of the site is low due to the prominence of the existing electric transmission infrastructure south of the site and the adjacent and nearby commercial, light-industrial, and heavy industrial uses. However, when viewed from the surrounding ridges that define Visitation Valley on the south, west, and north sides, visual quality is moderate-to-high with panoramic vista views over the Bayshore lowlands of the valley bottom to Candlestick Point and San Francisco Bay beyond. Visual absorption capability of the existing landscape is low given the absence of structures with similar character or vertical scale. Viewer sensitivity from nearby commercial and industrial uses is low while the viewer sensitivity for motorists on Geneva Avenue and Bayshore Boulevard is considered moderate. Viewer sensitivity is considered high at McLaren Park and the residential neighborhoods to the north and west and along the northern slopes of San Bruno Mountain to the southwest. Overall viewer sensitivity is rated moderate-to-high. Viewer exposure is also rated high given the site's foreground to middleground viewing distance and central position in the viewsheds from the numerous residential areas to the north, west, and south of the site. The site would also be highly visible as a foreground visual element in views from northbound and southbound Bayshore Boulevard and eastbound Geneva Avenue. Overall visual impact susceptibility is considered moderate-to-high.

There are few structures of substantial height in the project vicinity, as most facilities exhibit a characteristic low, rectangular form with horizontal lines being more prominent than vertical. Therefore, the power plant would introduce a high level of visual contrast into the viewshed given the general absence of structures with similar visual characteristics. The power plant would be a co-dominant to dominant feature in the foreground to middleground landscape when viewed from the higher elevation residential areas and surrounding hills and ridges, including McLaren Park. View blockage of wetland and Bay landscapes would be moderate when viewed from these elevated perspectives. The severity of the resulting visual impact on views within Visitation Valley would be high and the visual impact would be significant and unavoidable.

### **ALT-D South San Francisco, East Jamie Court**

The ALT-D site is located south of East Jamie Court and east of Haskins Way, in the industrial park area south of East Grand Avenue. The site is located on a level, vacant parcel that appears to be partially used for equipment storage. To the immediate north of the site is a Yellow Freight Systems facility. To the east of the site are industrial facilities including a recycling center. To the south are Bay wetlands while west of the site is an industrial park development. Also, at a higher elevation and within a foreground viewing distance of the site (though with limited views), are the office buildings to the north known as "The Courtyard" at 383/393 East Grand Avenue and the Hilltop Business Center on Grandview Drive.

The existing visual quality in the immediate vicinity of the site is low due to the abandoned nature of the site and the prominence of the nearby industrial and light industrial uses. However, when viewed from more distant, higher elevation residential areas to the north, west, and southwest of the site, landscape visual quality appears more moderate given the panoramic vistas over the highly urbanized near Bay lowlands to the expanse of San Francisco Bay and the East Bay Hills beyond. Visual absorption capability of the existing landscape is moderate due to the industrial character of the immediate vicinity and the presence of the industrial structures to the east of the site. When viewed from greater distances, the higher topography of nearby San Bruno Point appears in close proximity to the project site and would provide sufficient mass to partially balance the introduction of the new plant facilities. Viewer sensitivity from nearby commercial and industrial uses is low while the viewer sensitivity would be high for the more distant residential neighborhoods to the north of the site at the base of San Bruno Mountain in South San Francisco. Overall viewer sensitivity is rated moderate-to-high. Viewer exposure is rated moderate given the site's foreground-to-distant middleground viewing distances from the residential areas to the north, west, and southwest of the site. The residential neighborhoods to the north are approximately one mile distant. The elevated residential areas to the west and southwest are up to two and one-half miles from the site. From the northern residential viewing areas, views tend to be oriented to the southeast in the general direction of the airport. The ALT-D site would not be in the center of views from these locations. The more distant residential viewing locations to the west and southwest of the site would generally be oriented to the east in the direction of the airport, which is located approximately mid-point in the viewshed extending from San Bruno Point in the north to San Mateo Point or Coyote Point in the south. The ALT-D site is located to the north of the center of the



view, adjacent to San Bruno Point. Overall visual impact susceptibility is considered low-to-moderate.

Given the presence of similar structural forms and lines associated with the industrial facilities and recycling center immediately adjacent and to the east of the ALT-D site, the power plant would introduce a low-to-moderate level of visual contrast into the existing viewshed. The power plant would appear co-dominant with the recycling center and prominent land mass of San Bruno Point when viewed from residential areas located one to two and one-half miles distant. View blockage of Bay landscapes would be low-to-moderate when viewed from these elevated perspectives. The severity of the resulting visual impact would be low-to-moderate and the visual impact would be adverse but not significant.

### **ALT-E SF Airport, United Golden Gate (UGG) Site**

The ALT-E site is located south of North Access Road adjacent to the United Airlines cogeneration plant and maintenance facilities. To the east, south, and west of the site are airport facilities. To the north of the site are additional airport facilities, shoreline wetlands, and a homeless shelter.

The existing visual quality in the immediate vicinity of the site is low due to the industrial nature of the adjacent maintenance, fueling, and cogeneration facilities. Visual absorption capability of the existing landscape is moderate-to-high as a result of the industrial character and substantial mass of the adjacent structures. Viewer sensitivity from nearby commercial and industrial uses is low while the viewer sensitivity would be high for the more distant residential neighborhoods to the north of the site at the base of San Bruno Mountain in South San Francisco. Overall viewer sensitivity is rated moderate-to-high. Viewer exposure is rated moderate given the site's middleground viewing distance and its central position in the viewshed that generally extends from San Bruno Point in the north to San Mateo Point or Coyote Point in the south. The residential neighborhoods to the north are slightly over one mile distant (located north of downtown South San Francisco). The elevated residential areas to the west and southwest are up to two and one-half miles from the site. From the residential viewing areas to the north, views tend to be oriented to the southeast in the general direction of the site. The site would appear in the center of views from these locations. The more distant residential viewing locations would generally be oriented to the east, again in the direction of the site and airport which is located approximately midway between San Bruno Point and Coyote Point. Overall visual impact susceptibility is considered moderate.

Given the presence of similar structural forms and lines associated with the airport maintenance and fueling facilities and cogeneration plant immediately adjacent to the ALT-E site, the power plant would introduce a low-to-moderate level of visual contrast into the existing viewshed. The power plant would appear co-dominant with the existing airport facilities when viewed from residential areas located one to two and one-half miles distant. At these distances, view blockage of the Bay and Coyote Point (when viewed from the north) would be low. The severity of the resulting visual impact would be low-to-moderate and the visual impact would be adverse but not significant.

## **Conclusions**

Visual impacts of ALT-A, ALT-D, and ALT-E would be adverse but not significant. ALT-B and ALT-C would create significant and unavoidable visual impacts due to the local settings and the high degree of visibility that a power plant would have in these locations.

## **WASTE MANAGEMENT**

**Mike Ringer**

### **Analysis**

Hazardous and non-hazardous wastes would be generated during facility construction and operation. This analysis discusses the waste management implications of locating the proposed Potrero Power Plant Unit 7 Project at selected alternative sites compared to the proposed site.

### **Construction**

Wastes generated during project construction include those related to site preparation as well as construction of the facility. As long as the design of the project does not change significantly, the types and quantities of wastes generated from construction of the facility itself would not vary substantially among sites.

Wastes generated during site preparation would vary according to the extent of contamination that might exist, the need to remove existing structures, and contamination that could exist along the length of linear facilities. Potential sources of site-specific contamination could include existing on-site landfills, unauthorized dumping, spills from hazardous materials containers being transported over or temporarily parked at the site, and migration of chemicals from nearby leaking tanks or waste sites. Even though a site may appear to be vacant with no evidence of contamination, an investigation is necessary to assess the likelihood of possible contamination.

### **Impacts at the Proposed Unit 7 Site**

The proposed site contains a group of structures known as the Station A complex, which will be removed prior to Unit 7 construction. Removal of foundations and other belowground structures are included as part of the proposed project. Concentrations of nickel, chromium, and lead were found in excess of regulatory levels at all depths throughout the excavation footprints. Staff did not conclude that there would be any significant waste management related impacts associated with site preparation for the Unit 7 project.

The potential for contamination along linear routes associated with each alternative is unknown without a site-specific assessment. However, the existence of contamination may not imply that there would be a significant impact during linear facility construction, since it could be cleaned up either before or during construction. Natural gas would be supplied to the project via an existing gas supply pipeline. Excavation would be required for two 9,400 feet underground transmission cables to connect Unit 7 to PG&E's Hunters Point Substation, the cooling water intake for Potrero Unit 3, which would be replaced and combined with a new intake for Unit 7, and two new cooling

water discharge systems, with diffusers, to serve both the new unit 7 and existing unit 3. Contaminated sediments are present along the proposed alignments for the cooling water intake and discharge pipes, but until the results of ongoing investigations are available, the extent of the contamination is unclear. However, sediments removed would have to be disposed of appropriately.

## **Impacts of Alternative Sites**

### **ALT-A**

Site ALT-A is located at Cargo Way in San Francisco and was approved for a power plant site in 1995 by the Energy Commission.

Phase I and II Environmental Site Assessments conducted for the property found that chemicals of concern were generally present in fill material over the entire site. Chemicals were found at apparently random locations within the fill material, showing no clear concentration trends with depth. Soil sample locations in relationship to groundwater depth also did not seem to influence the distribution of chemicals at the site. High concentrations of metals and organic chemicals were found in samples collected both above and below the water table. Investigators speculated that deposition of wastes during previous landfilling activities was probably a major contributor to the distribution pattern of metals and other chemicals identified in the soils. Staff ultimately concluded that management of the wastes generated during project construction at that site would not result in any significant adverse impacts if appropriate mitigation measures were implemented.

### **ALT-B**

Site ALT-B, a parking lot located north of Gilman Avenue across from 3Com Park, is vacant land adjacent to undeveloped park property. The potential for contamination at this site is not known in the absence of an Environmental Site Assessment.

### **ALT-C**

Site ALT-C is immediately northwest of the intersection of Bayshore Boulevard and Geneva Avenue. The site is located entirely north of Geneva and has undergone remediation for heavy metals contamination. The area south of Geneva remains contaminated with hydrocarbons. Staff is unaware if all contamination issues have been resolved north of Geneva, or if additional issues remain.

### **ALT-D**

Site ALT-D is southeast of the intersection of Haskins Way and East Jamie Court, adjacent to the City of South San Francisco recycling facility. Staff currently does not have information regarding the potential for contamination at this site.

### **ALT-E**

ALT-E is south of North Access Road adjacent to the United Golden Gate peaking power plant recently approved by the Commission. A Phase I Environmental Site Assessment was conducted for the peaking power plant site. Prior to its use as a parking lot, the site was occupied by mudflats adjacent to San Francisco Bay which

were reclaimed by the addition of fill material. No areas of environmental concern were identified, and no additional investigation was recommended.

### **Operation**

The amounts and types of most wastes generated during routine facility operation, such as used oil, solvents, batteries, air pollution control catalyst, and the like, are a function of facility design, and not location. Wastes generated from treating water used in plant operations could vary slightly, depending on the quality of the source water. Types and amounts of normally occurring constituents can vary greatly in ground and surface water supplies, and the use of reclaimed water may require special treatment options. In addition, site specific considerations may lead to differences in wastewater disposal options, such as zero discharge or the use of evaporation ponds, which in turn may influence the quantity and types of wastes generated from water treatment and use. However, site specific differences in water supply and quality may not lead to significant differences in waste management impacts, since these are usually either minor, or can be mitigated successfully.

### **Conclusion**

Staff finds that contamination at the proposed site can be mitigated to less than significant impacts with implementation of recommended conditions of certification. Wastes generated from construction and operation of the facility itself will not vary with project location. Some differences in the quantity and types of project operational wastes at alternative sites could result, but such differences would be very minor. For sites lacking an Environmental Site Assessment, the amounts of hazardous or non-hazardous waste that may be generated during site preparation is speculative.

Site ALT-A is known to have existing contamination. The potential for contamination at Alts-B, C, and D is not known, while ALT-E is unlikely to contain any significant contamination, based on the site assessment performed there. In most cases, however, management of hazardous wastes from site cleanup activities can be accomplished without significant adverse environmental impacts.

# **GENERAL CONDITIONS INCLUDING COMPLIANCE MONITORING AND CLOSURE PLAN**

Testimony of Donna Stone

## **INTRODUCTION**

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The project General Conditions Including Compliance Monitoring and Closure Plan (Compliance Plan) have been established as required by Public Resources Code section 25532. The plan provides a means for assuring that the facility is constructed, operated and closed in conjunction with air and water quality, public health and safety, environmental and other applicable regulations, guidelines, and conditions adopted or established by the California Energy Commission (Energy Commission) and specified in the written decision on the Application for Certification or otherwise required by law.

The Compliance Plan is composed of the following elements:

1. General conditions that:
  - a) set forth the duties and responsibilities of the Compliance Project Manager (CPM), the project owner, delegate agencies, and others;
  - b) set forth the requirements for handling confidential records and maintaining the compliance record;
  - c) state procedures for settling disputes and making post-certification changes;
  - d) state the requirements for periodic compliance reports and other administrative procedures that are necessary to verify the compliance status for all Energy Commission approved conditions; and
  - e) establish requirements for facility closure plans.
2. Specific conditions of certification:

Specific conditions of certification that follow each technical area contain the measures required to mitigate any and all potential adverse project impacts associated with construction, operation and closure to an insignificant level. Each specific condition of certification also includes a verification provision that describes the method of verifying that the condition has been satisfied.

## **GENERAL CONDITIONS OF CERTIFICATION**

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### **DEFINITIONS**

To ensure consistency, continuity and efficiency, the following terms, as defined, apply to all technical areas, including Conditions of Certification:

### **SITE MOBILIZATION:**

Moving trailers and related equipment onto the site, usually accompanied by minor ground disturbance, grading for the trailers and limited vehicle parking, trenching for utilities, installing utilities, grading for an access corridor, and other related activities. Ground disturbance, grading, etc. for site mobilization are limited to the portion of the site necessary for placing the trailers and providing access and parking for the occupants. Site mobilization is for temporary facilities and is therefore not considered construction.

#### **GROUND DISTURBANCE:**

Onsite activity that results in the removal of soil or vegetation, boring, trenching or alteration of the site surface. This does not include driving or parking a passenger vehicle, pickup truck, or other light vehicle, or walking on the site.

#### **GRADING:**

Onsite activity conducted with earth-moving equipment that results in alteration of the topographical features of the site such as leveling, removal of hills or high spots, or moving of soil from one area to another.

#### **CONSTRUCTION:**

[From section 25105 of the Warren-Alquist Act.] Onsite work to install permanent equipment or structures for any facility. Construction does **not** include the following:

- a. The installation of environmental monitoring equipment.
- b. A soil or geological investigation.
- c. A topographical survey.
- d. Any other study or investigation to determine the environmental acceptability or feasibility of the use of the site for any particular facility.
- e. Any work to provide access to the site for any of the purposes specified in a., b., c., or d.

#### **START OF COMMERCIAL OPERATION**

- a. The project startup team has completed work.
- b. The plant manager accepts control from the construction manager.
- c. Expenses for the project are switched from construction to operation.
- d. The facility has reached steady state with reliability at the rated capacity.
- e. Financing accounting switches from construction (capital costs) to operations (Income-producing expenses) financing.

#### **COMPLIANCE PROJECT MANAGER (CPM) RESPONSIBILITIES**

A CPM will oversee the compliance monitoring and shall be responsible for:

- 1. ensuring that the design, construction, operation, and closure of the project facilities is in compliance with the terms and conditions of the Commission Decision;
- 2. resolving complaints;

3. processing post-certification changes to the conditions of certification, project description, and ownership or operational control;
4. documenting and tracking compliance filings; and,
5. ensuring that the compliance files are maintained and accessible.

The CPM is the contact person for the Energy Commission and will consult with appropriate responsible agencies and the Energy Commission when handling disputes, complaints and amendments.

All project compliance submittals are submitted to the CPM for processing. Where a submittal required by a condition of certification requires CPM approval, it should be understood that the approval would involve all appropriate staff and management.

The Commission has established a toll free compliance telephone number of **1-800-858-0784** for the public to contact the Commission about power plant construction or operation-related questions, complaints or concerns.

### **Pre-Construction and Pre-Operation Compliance Meeting**

The CPM may schedule pre-construction and pre-operation compliance meetings prior to the projected start-dates of construction, plant operation, or both. The purpose of these meetings will be to assemble both the Energy Commission's and the project owner's technical staff to review the status of all pre-construction or pre-operation requirements and milestones contained in the Energy Commission's conditions of certification to confirm that they have been met, or if they have not been met, to ensure that the proper action is taken. In addition, these meetings shall ensure, to the extent possible, that Energy Commission conditions will not delay the construction and operation of the plant due to oversight or inadvertence and to preclude any last minute, unforeseen issues from arising. Pre-construction meetings held during the certification process must be publicly noticed unless they are confined to administrative issues and processes.

### **Energy Commission Record**

The Energy Commission shall maintain as a public record, in either the Compliance file or Docket file, for the life of the project (or other period as required):

1. all documents demonstrating compliance with any legal requirements relating to the construction and operation of the facility;
2. all monthly and annual compliance reports filed by the project owner;
3. all complaints of noncompliance filed with the Energy Commission; and,
4. all petitions for project or condition changes and the resulting staff or Energy Commission action taken.

## **PROJECT OWNER RESPONSIBILITIES**

It is the responsibility of the project owner to ensure that the general compliance conditions and the conditions of certification are satisfied. The general compliance conditions regarding post-certification changes specify measures that the project owner must take when requesting changes in the project design, compliance conditions, or ownership. Failure to comply with any of the conditions of certification or the general

compliance conditions may result in reopening of the case and revocation of Energy Commission certification, an administrative fine, or other action as appropriate.

### **Access**

The CPM, responsible Energy Commission staff, and delegate agencies or consultants, shall be guaranteed and granted unrestricted access to the power plant site, related facilities, project-related staff, and the records maintained on site, for the purpose of conducting audits, surveys, inspections, or general site visits. Although the CPM will normally schedule site visits on dates and times agreeable to the project owner, the CPM reserves the right to make unannounced visits at any time.

### **Compliance Record**

The project owner shall maintain project files on-site or at an alternative site approved by the CPM, for the life of the project. The files shall contain copies of all “as-built” drawings, all documents submitted as verification for conditions, and all other project-related documents for the life of the project, unless a lesser period is specified by the conditions of certification.

Energy Commission staff and delegate agencies shall, upon request to the project owner, be given unrestricted access to the files.

### **Compliance Verifications**

Each condition of certification is followed by a means of verification. The verification describes the Energy Commission’s procedure(s) to ensure post-certification compliance with adopted conditions. The verification procedures, unlike the conditions, may be modified, as necessary by the CPM, and in most cases without full Energy Commission approval.

Verification of compliance with the conditions of certification can be accomplished by:

reporting on the work done and providing the pertinent documentation in monthly and/or annual compliance reports filed by the project owner or authorized agent as required by the specific conditions of certification;  
appropriate letters from delegate agencies verifying compliance;  
Energy Commission staff audits of project records; and/or  
Energy Commission staff inspections of mitigation and/or other evidence of mitigation.

Verification lead times (e.g., 90, 60 and 30-days) associated with start of construction may require the project owner to file submittals during the certification process, particularly if construction is planned to commence shortly after certification.

A cover letter from the project owner or authorized agent is required for all compliance submittals and correspondence pertaining to compliance matters. **The cover letter subject line shall identify the involved condition(s) of certification by condition number and include a brief description of the subject of the submittal.** The project owner shall also identify those submittals **not** required by a condition of certification with a statement such as: “This submittal is for information only and is not required by a specific condition of certification.” When submitting supplementary or corrected information, the project owner shall reference the date of the previous submittal.



The project owner is responsible for the delivery and content of all verification submittals to the CPM, whether such condition was satisfied by work performed by the project owner or an agent of the project owner.

All submittals shall be addressed as follows:

**Compliance Project Manager  
California Energy Commission  
1516 Ninth Street (MS-2000)  
Sacramento, CA 95814**

If the project owner desires Energy Commission staff action by a specific date, they shall so state in their submittal and include a detailed explanation of the effects on the project if this date is not met.

### **Compliance Reporting**

There are two different compliance reports that the project owner must submit to assist the CPM in tracking activities and monitoring compliance with the terms and conditions of the Commission Decision. During construction, the project owner or authorized agent will submit Monthly Compliance Reports. During operation, an Annual Compliance Report must be submitted. These reports, and the requirement for an accompanying compliance matrix, are described below. The majority of the conditions of certification require that compliance submittals be submitted to the CPM in the monthly or annual compliance reports.

### **Compliance Matrix**

A compliance matrix shall be submitted by the project owner to the CPM along with each monthly and annual compliance report. The compliance matrix is intended to provide the CPM with the current status of all compliance conditions in a spreadsheet format. The compliance matrix must identify:

1. the technical area,
2. the condition number,
3. a brief description of the verification action or submittal required by the condition,
4. the date the submittal is required (e.g., 60 days prior to construction, after final inspection, etc.),
5. the expected or actual submittal date,
6. the date a submittal or action was approved by the Chief Building Official (CBO), CPM, or delegate agency, if applicable,
7. the compliance status for each condition (e.g., “not started”, “in progress” or “completed date”), and
8. the project’s preconstruction and construction milestones, including dates and status.

Completed or satisfied conditions do not need to be included in the compliance matrix after they have been identified as completed/satisfied in at least one monthly or annual compliance report.

## **Pre-Construction Matrix**

Prior to commencing construction a compliance matrix addressing only those conditions that must be fulfilled before the start of construction shall be submitted by the project owner to the CPM. This matrix will be included with the project owner's **first** compliance submittal. It will be in the same format as the compliance matrix referenced above.

## **Tasks Prior to Start of Construction**

Construction shall not commence until the pre-construction matrix is submitted, all pre-construction conditions have been complied with, and the CPM has issued a letter to the project owner authorizing construction. Project owners frequently anticipate starting project construction as soon as the project is certified. In some cases it may be necessary for the project owner to file submittals prior to certification if the required lead-time for a required compliance event extends beyond the date anticipated for start of construction. It is also important that the project owner understand that pre-construction activities that are initiated prior to certification are performed at the owner's own risk. Failure to allow specified lead-time may cause delays in start of construction.

Various lead times for verification submittals to the CPM for conditions of certification are established to allow sufficient staff time to review and comment, and if necessary, allow the project owner to revise the submittal in a timely manner. This will ensure that project construction may proceed according to schedule.

## **Monthly Compliance Report**

The first Monthly Compliance Report is due the month following the Energy Commission business meeting date on which the project was approved, unless otherwise agreed to by the CPM. The first Monthly Compliance Report shall include an initial list of dates for each of the events identified on the Key Events List. The Key Events List is found at the end of this section.

During pre-construction and construction of the project, the project owner or authorized agent shall submit an original and five copies of the Monthly Compliance Report within 10 working days after the end of each reporting month. Monthly Compliance Reports shall be clearly identified for the month being reported. The reports shall contain at a minimum:

1. a summary of the current project construction and milestones status, a revised/updated schedule if there are significant delays, and an explanation of any significant changes to the schedule;
2. documents required by specific conditions to be submitted along with the Monthly Compliance Report. Each of these items must be identified in the transmittal letter, and should be submitted as attachments to the Monthly Compliance Report;
3. an initial, and thereafter updated, compliance matrix which shows the status of all conditions of certification and preconstruction and construction milestones (fully satisfied and/or closed conditions do not need to be included in the matrix after they have been reported as closed);

4. a list of conditions and milestones that have been satisfied during the reporting period, and a description or reference to the actions which satisfied the condition;
5. a list of any submittal deadlines that were missed accompanied by an explanation and an estimate of when the information will be provided;
6. a cumulative listing of any approved changes to conditions of certification;
7. a listing of any filings with, or permits issued by, other governmental agencies during the month;
8. a projection of project compliance activities scheduled during the next two months. The project owner shall notify the CPM as soon as any changes are made to the project construction schedule that would affect compliance with conditions of certification or milestones;
9. a listing of the month's additions to the on-site compliance file; and
10. any requests to dispose of items that are required to be maintained in the project owner's compliance file.
11. a listing of complaints, notices of violation, official warnings, and citations received during the month; a description of the resolution of any complaints which have been resolved, and the status of any unresolved complaints.

### **Annual Compliance Report**

After the air district has issued a Permit to Operate, the project owner shall submit Annual Compliance Reports instead of Monthly Compliance Reports. The reports are for each year of commercial operation and are due to the CPM each year at a date agreed to by the CPM. Annual Compliance Reports shall be submitted over the life of the project unless otherwise specified by the CPM. Each Annual Compliance Report shall identify the reporting period and shall contain the following:

1. an updated compliance matrix which shows the status of all conditions of certification (fully satisfied and/or closed conditions do not need to be included in the matrix after they have been reported as closed);
2. a summary of the current project operating status and an explanation of any significant changes to facility operations during the year;
3. documents required by specific conditions to be submitted along with the Annual Compliance Report. Each of these items must be identified in the transmittal letter, and should be submitted as attachments to the Annual Compliance Report;
4. a cumulative listing of all post-certification changes approved by the Energy Commission or cleared by the CPM;
5. an explanation for any submittal deadlines that were missed, accompanied by an estimate of when the information will be provided;
6. a listing of filings made to, or permits issued by, other governmental agencies during the year;
7. a projection of project compliance activities scheduled during the next year;
8. a listing of the year's additions to the on-site compliance file, and
9. an evaluation of the on-site contingency plan for unexpected facility closure, including any suggestions necessary for bringing the plan up to date [see General Conditions for Facility Closure addressed later in this section].

10. a listing of complaints, notices of violation, official warnings, and citations received during the year; a description of the resolution of any complaints which have been resolved, and the status of any unresolved complaints.

### **Confidential Information**

Any information, which the project owner deems confidential shall be submitted to the Energy Commission's Docket with an application for confidentiality pursuant to Title 20, California Code of Regulations, section 2505(a). Any information, which is determined to be confidential, shall be kept confidential as provided for in Title 20, California Code of Regulations, section 2501 et. seq.

### **Department of Fish and Game Filing Fee**

Pursuant to the provisions of Fish and Game Code Section 711.4, the project owner shall pay a filing fee in the amount of eight hundred and fifty dollars (\$850). The payment instrument shall be provided to the Commission's Project Manager at the time of project certification and shall be made payable to the California Department of Fish and Game. The Commission's Project Manager will submit the payment to the Office of Planning and Research at the time of filing of the notice of decision pursuant to Public Resources Code Section 21080.5.

### **Reporting of Complaints, Notices, and Citations**

Prior to the start of construction, the project owner must send a letter to property owners living within one mile of the project notifying them of a telephone number to contact project representatives with questions, complaints or concerns. If the telephone is not staffed 24 hours per day, it shall include automatic answering, with date and time stamp recording. All recorded inquiries shall be responded to within 24 hours. The telephone number shall be posted at the project site and made easily visible to passersby during construction and operation. The telephone number shall be provided to the CPM who will post it on the Energy Commission's web page at [www.energy.ca.gov/sitingcases](http://www.energy.ca.gov/sitingcases). Any changes to the telephone number shall be submitted immediately to the CPM who will update the web page.

In addition to the monthly and annual compliance reporting requirements described above, the project owner shall report and provide copies of all complaint forms, notices of violation, notices of fines, official warnings, and citations, within 10 days of receipt, to the CPM. Complaints shall be logged and numbered. Noise complaints shall be recorded on the form provided in the **NOISE** conditions of certification. All other complaints shall be recorded on the complaint form on the following page.

COMPLAINT REPORT/RESOLUTION FORM

PROJECT NAME: AFC Number:	
<b>COMPLAINT LOG NUMBER</b> _____ Complainant's name and address:   Phone number:	
Date and time complaint received: Indicate if by telephone or in writing (attach copy if written): Date of first occurrence:	
Description of complaint (including dates, frequency, and duration):     	
Findings of investigation by plant personnel:     Indicate if complaint relates to violation of a CEC requirement: Date complainant contacted to discuss findings:	
Description of corrective measures taken or other complaint resolution:        Indicate if complainant agrees with proposed resolution: If not, explain:     Other relevant information:	
If corrective action necessary, date completed: Date first letter sent to complainant: _____(copy attached) Date final letter sent to complainant: _____(copy attached)	
This information is certified to be correct. Plant Manager's Signature: _____ Date: _____	

(Attach additional pages and supporting documentation, as required.)

## CONSTRUCTION MILESTONES

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The following is the procedure for establishing and enforcing milestones, which include milestone dates for pre-construction and construction phases of the project.

Milestones, and method of verification must be established and agreed upon by the project owner and the CPM no later than 30 days after project approval, the date of docketing. If this deadline is not met, the CPM will establish the milestones.

### I. ESTABLISH PRE-CONSTRUCTION MILESTONES TO ENABLE START OF CONSTRUCTION WITHIN ONE YEAR OF CERTIFICATION

1. Obtain site control.
2. Obtain financing.
3. Mobilize site.
4. Begin rough grading for permanent structures (start of construction).

### II. ESTABLISH CONSTRUCTION MILESTONES FROM DATE OF START OF CONSTRUCTION

1. Begin pouring major foundation concrete.
2. Begin installation of major equipment.
3. Complete installation of major equipment.
4. Begin gas pipeline construction.
5. Complete gas pipeline interconnection.
6. Begin T-line construction.
7. Complete T-line interconnection.
8. Begin commercial operation.

The CPM will negotiate the above-cited pre-construction and construction milestones with the project owner based on an expected schedule of construction. The CPM may agree to modify the final milestones from those listed above at any time prior to or during construction if the project owner demonstrates good-cause for not meeting the originally-established milestones. Otherwise, failure to meet milestone dates without a finding of good cause is considered cause for possible forfeiture of certification or other penalties.

### III. A FINDING THAT THERE IS GOOD CAUSE FOR FAILURE TO MEET MILESTONES WILL BE MADE IF ANY OF THE FOLLOWING CRITERIA ARE MET:

1. The change in any milestone does not change the established commercial operation date milestone.
2. The milestone is changed due to circumstances beyond the project owner's control.
3. The milestone will be missed, but the project owner demonstrates a good-faith effort to meet the project milestone.
4. The milestone is missed due to unforeseen natural disasters or acts of God which prevent timely completion of the milestones.

If a milestone date cannot be met, the CPM will make a determination whether the project owner has demonstrated good cause for failure to meet the milestone. If the determination is that good cause exists, the CPM will negotiate revised milestones.

If the project owner fails to meet one or more of the established milestones, and the CPM determines that good cause does not exist, the CPM will make a recommendation to the Executive Director. Upon receiving such recommendation, the Executive Director will take one of the following actions.

1. Conclude that good cause exists and direct that revised milestones be established; or
2. Issue a reprimand, impose a fine, or take other appropriate remedial action and direct that revised milestones be established; or
3. Recommend, after consulting with the Energy Facility Siting and Environmental Committee, that the Commission issue a finding that the project owner has forfeited the project's certification.

The project owner has the right to appeal a finding of no good cause, or any recommended remedial action, to the Energy Facility Siting and Environmental Committee, and to the full Commission.

## **FACILITY CLOSURE**

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At some point in the future, the project will cease operation and close down. At that time, it will be necessary to ensure that the closure occurs in such a way that public health and safety and the environment are protected from adverse impacts. Although the project setting for this project does not appear, at this time, to present any special or unusual closure problems, it is impossible to foresee what the situation will be in 30 years or more when the project ceases operation. Therefore, provisions must be made which provide the flexibility to deal with the specific situation and project setting which that exist at the time of closure. LORS pertaining to facility closure are identified in the sections dealing with each technical area. Facility closure will be consistent with LORS in effect at the time of closure.

There are at least three circumstances in which a facility closure can take place, planned closure, unexpected temporary closure and unexpected permanent closure.

### **PLANNED CLOSURE**

A planned closure occurs at the end of a project's life, when the facility is closed in an anticipated, orderly manner, at the end of its useful economic or mechanical life, or due to gradual obsolescence.

### **UNEXPECTED TEMPORARY CLOSURE**

An unplanned unexpected temporary closure occurs when the facility is closed suddenly and/or unexpectedly, on a short-term basis, due to unforeseen circumstances such as a natural disaster, or an emergency.

## **UNEXPECTED PERMANENT CLOSURE**

An unplanned unexpected permanent closure occurs if the project owner closes the facility suddenly and/or unexpectedly, on a permanent basis. This includes unexpected closure where the owner remains accountable for implementing the on-site contingency plan. It can also include unexpected closure where the project owner is unable to implement the contingency plan, and the project is essentially abandoned.

## **GENERAL CONDITIONS FOR FACILITY CLOSURE**

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### **PLANNED CLOSURE**

In order to ensure that a planned facility closure does not create adverse impacts, a closure process that provides for careful consideration of available options and applicable laws, ordinances, regulations, standards, and local/regional plans in existence at the time of closure, will be undertaken. To ensure adequate review of a planned project closure, the project owner shall submit a proposed facility closure plan to the Energy Commission for review and approval at least twelve months prior to commencement of closure activities (or other period of time agreed to by the CPM). The project owner shall file 120 copies (or other number of copies agreed upon by the CPM) of a proposed facility closure plan with the Energy Commission.

The plan shall:

1. identify and discuss any impacts and mitigation to address significant adverse impacts associated with proposed closure activities and to address facilities, equipment, or other project related remnants that will remain at the site.
2. identify a schedule of activities for closure of the power plant site, transmission line corridor, and all other appurtenant facilities constructed as part of the project;
3. identify any facilities or equipment intended to remain on site after closure, the reason, and any future use; and
4. address conformance of the plan with all applicable laws, ordinances, regulations, standards, local/regional plans in existence at the time of facility closure, and applicable conditions of certification.

Also, in the event that there are significant issues associated with the proposed facility closure plan's approval, or the desires of local officials or interested parties are inconsistent with the plan, the CPM shall hold one or more workshops and/or the Commission may hold public hearings as part of its approval procedure.

In addition, prior to submittal of the proposed facility closure plan, a meeting shall be held between the project owner and the Commission CPM for the purpose of discussing the specific contents of the plan.

As necessary, prior to, or during the closure plan process, the project owner shall take appropriate steps to eliminate any immediate threats to public health and safety and the



environment, but shall not commence any other closure activities, until Commission approval of the facility closure plan is obtained.

## **UNEXPECTED TEMPORARY CLOSURE**

In order to ensure that public health and safety and the environment are protected in the event of an unexpected temporary facility closure, it is essential to have an on-site contingency plan in place. The on-site contingency plan will help to ensure that all necessary steps to mitigate public health and safety, and environmental impacts, are taken in a timely manner.

The project owner shall submit an on-site contingency plan for CPM review and approval. The plan shall be submitted no less than 60 days (or other time agreed to by the CPM) prior to commencement of commercial operation. The approved plan must be in place prior to commercial operation of the facility and shall be kept at the site at all times.

The project owner, in consultation with the CPM, will update the on-site contingency plan as necessary. The CPM may require revisions to the on-site contingency plan over the life of the project. In the annual compliance reports submitted to the Energy Commission, the project owner will review the on-site contingency plan, and recommend changes to bring the plan up to date. Any changes to the plan must be approved by the CPM.

The on-site contingency plan shall provide for taking immediate steps to secure the facility from trespassing or encroachment. In addition, for closures of more than 90 days (unless other arrangements are agreed to by the CPM), the plan shall provide for removal of hazardous materials and hazardous wastes, draining of all chemicals from storage tanks and other equipment and the safe shutdown of all equipment (also see specific conditions of certification for the technical areas of Hazardous Materials Management and Waste Management).

In addition, consistent with requirements under unexpected permanent closure addressed below, the nature and extent of insurance coverage, and major equipment warranties must also be included in the on-site contingency plan. In addition, the status of the insurance coverage and major equipment warranties must be updated in the annual compliance reports.

In the event of an unexpected temporary closure, the project owner shall notify the CPM, as well as other responsible agencies, by telephone, fax, e-mail, etc., within 24 hours and shall take all necessary steps to implement the on-site contingency plan. The project owner shall keep the CPM informed of the circumstances and expected duration of the closure.

If the CPM determines that a temporary closure is likely to be permanent, or for a duration of more than twelve months, a closure plan consistent with that for a planned closure shall be developed and submitted to the CPM within 90 days of the CPM's determination (or other period of time agreed to by the CPM).

## **UNEXPECTED PERMANENT CLOSURE**

The on-site contingency plan required for unexpected temporary closure shall also cover unexpected permanent facility closure. All of the requirements specified for unexpected temporary closure shall also apply to unexpected permanent closure.

In addition, the on-site contingency plan shall address how the project owner will ensure that all required closure steps will be successfully undertaken in the unlikely event of abandonment.

In the event of an unexpected permanent closure, the project owner shall notify the CPM, as well as other responsible agencies, by telephone, fax, e-mail, etc., within 24 hours and shall take all necessary steps to implement the on-site contingency plan. The project owner shall keep the CPM informed of the status of all closure activities.

A closure plan consistent with that for a planned closure shall be developed and submitted to the CPM within 90 days of the permanent closure (or other period of time agreed to by the CPM).

## **DELEGATE AGENCIES**

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To the extent permitted by law, the Energy Commission may delegate authority for compliance verification and enforcement to various state and local agencies that have expertise in subject areas where specific requirements have been established as a condition of certification. If a delegate agency does not participate in this program, the Energy Commission staff will establish an alternative method of verification and enforcement. Energy Commission staff reserves the right to independently verify compliance.

In performing construction and operation monitoring of the project, the Energy Commission staff acts as, and has the authority of, the Chief Building Official (CBO). The Commission staff retains this authority when delegating to a local CBO. Delegation of authority for compliance verification includes the authority for enforcing codes, the responsibility for code interpretation where required, and the authority to use discretion, as necessary, in implementing the various codes and standards.

Whenever an agency's responsibility for a particular area is transferred by law to another entity, all references to the original agency shall be interpreted to apply to the successor entity.

## **ENFORCEMENT**

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The Energy Commission's legal authority to enforce the terms and conditions of its Decision is specified in Public Resources Code sections 25534 and 25900. The Energy Commission may amend or revoke the certification for any facility, and may impose a civil penalty for any significant failure to comply with the terms or conditions of the Commission Decision. The specific action and amount of any fines the Commission may impose would take into account the specific circumstances of the incident(s). This would include such factors as the previous compliance history, whether the cause of the

incident involves willful disregard of LORS, inadvertence, unforeseeable events, and other factors the Commission may consider.

Moreover, to ensure compliance with the terms and conditions of certification and applicable laws, ordinances, regulations, and standards, delegate agencies are authorized to take any action allowed by law in accordance with their statutory authority, regulations, and administrative procedures.

## **NONCOMPLIANCE COMPLAINT PROCEDURES**

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Any person or agency may file a complaint alleging noncompliance with the conditions of certification. Such a complaint will be subject to review by the Energy Commission pursuant to Title 20, California Code of Regulations, section 1230 et. seq., but in many instances the noncompliance can be resolved by using the informal dispute resolution process. Both the informal and formal complaint procedure, as described in current State law and regulations, are described below. They shall be followed unless superseded by current law or regulations.

### **INFORMAL DISPUTE RESOLUTION PROCEDURE**

The following procedure is designed to informally resolve disputes concerning interpretation of compliance with the requirements of this compliance plan. The project owner, the Energy Commission, or any other party, including members of the public, may initiate this procedure for resolving a dispute. Disputes may pertain to actions or decisions made by any party including the Energy Commission's delegate agents.

This procedure may precede the more formal complaint and investigation procedure specified in Title 20, California Code of Regulations, section 1230 et. seq., but is not intended to be a substitute for, or prerequisite to it. This informal procedure may not be used to change the terms and conditions of certification as approved by the Energy Commission, although the agreed upon resolution may result in a project owner, or in some cases the Energy Commission staff, proposing an amendment.

The procedure encourages all parties involved in a dispute to discuss the matter and to reach an agreement resolving the dispute. If a dispute cannot be resolved, then the matter must be referred to the full Energy Commission for consideration via the complaint and investigation process. The procedure for informal dispute resolution is as follows:

#### **Request for Informal Investigation**

Any individual, group, or agency may request the Energy Commission to conduct an informal investigation of alleged noncompliance with the Energy Commission's terms and conditions of certification. All requests for informal investigations shall be made to the designated CPM.

Upon receipt of a request for informal investigation, the CPM shall promptly notify the project owner of the allegation by telephone and letter. All known and relevant information of the alleged noncompliance shall be provided to the project owner and to the Energy Commission staff. The CPM will evaluate the request and the information to

determine if further investigation is necessary. If the CPM finds that further investigation is necessary, the project owner will be asked to promptly investigate the matter and within seven (7) working days of the CPM's request, provide a written report of the results of the investigation, including corrective measures proposed or undertaken, to the CPM. Depending on the urgency of the noncompliance matter, the CPM may conduct a site visit and/or request the project owner to provide an initial report, within forty-eight (48) hours, followed by a written report filed within seven (7) days.

### **Request for Informal Meeting**

In the event that either the party requesting an investigation or the Energy Commission staff is not satisfied with the project owner's report, investigation of the event, or corrective measures undertaken, either party may submit a written request to the CPM for a meeting with the project owner. Such request shall be made within fourteen (14) days of the project owner's filing of its written report. Upon receipt of such a request, the CPM shall:

1. immediately schedule a meeting with the requesting party and the project owner, to be held at a mutually convenient time and place;
2. secure the attendance of appropriate Energy Commission staff and staff of any other agency with expertise in the subject area of concern as necessary;
3. conduct such meeting in an informal and objective manner so as to encourage the voluntary settlement of the dispute in a fair and equitable manner; and,
4. after the conclusion of such a meeting, promptly prepare and distribute copies to all in attendance and to the project file, a summary memorandum which fairly and accurately identifies the positions of all parties and any conclusions reached. If an agreement has not been reached, the CPM shall inform the complainant of the formal complaint process and requirements provided under Title 20, California Code of Regulations, section 1230 et. seq.

### **FORMAL DISPUTE RESOLUTION PROCEDURE-COMPLAINTS AND INVESTIGATIONS**

If either the project owner, Energy Commission staff, or the party requesting an investigation is not satisfied with the results of the informal dispute resolution process, such party may file a complaint or a request for an investigation with the Energy Commission's General Counsel. Disputes may pertain to actions or decisions made by any party including the Energy Commission's delegate agents. Requirements for complaint filings and a description of how complaints are processed are in Title 20, California Code of Regulations, section 1230 et. seq.

The Chairman, upon receipt of a written request stating the basis of the dispute, may grant a hearing on the matter, consistent with the requirements of noticing provisions. The Commission shall have the authority to consider all relevant facts involved and make any appropriate orders consistent with its jurisdiction (Title 20, California Code of Regulations, sections 1232 - 1236).

## **POST CERTIFICATION CHANGES TO THE COMMISSION DECISION: AMENDMENTS, INSIGNIFICANT PROJECT CHANGES AND VERIFICATION CHANGES**

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The project owner must petition the Energy Commission, pursuant to Title 20, California Code of Regulations, section 1769, to 1) delete or change a condition of certification; 2) modify the project design or operational requirements; and 3) transfer ownership or operational control of the facility.

A petition is required for **amendments** and for **insignificant project changes**. For verification changes, a letter from the project owner is sufficient. In all cases, the petition or letter requesting a change should be submitted to the Commission's Docket in accordance with Title 20, California Code of Regulations, section 1209. The criteria that determine which type of change process applies are explained below.

### **AMENDMENT**

A proposed change will be processed as an amendment if it involves a change to the requirement or protocol (and in some cases the verification) portion of a condition of certification, an ownership or operator change, or a potential significant environmental impact.

### **INSIGNIFICANT PROJECT CHANGE**

The proposed change will be processed as an insignificant project change if it does not require changing the language in a condition of certification, have a potential for significant environmental impact, and cause the project to violate laws, ordinances, regulations or standards.

### **VERIFICATION CHANGE**

The proposed change will be processed as a verification change if it involves only the language in the verification portion of the condition of certification. This procedure can only be used to change verification requirements that are of an administrative nature, usually the timing of a required action. In the unlikely event that verification language contains technical requirements, the proposed change must be processed as an amendment.

# KEY EVENT LIST

PROJECT: \_\_\_\_\_

DOCKET #: \_\_\_\_\_

COMPLIANCE PROJECT MANAGER: \_\_\_\_\_

## EVENT DESCRIPTION

## DATE

Certification Date	
Online Date	
<b>POWER PLANT SITE ACTIVITIES</b>	
Start Site Mobilization	
Start Ground Disturbance	
Start Rough Grading	
Start Construction	
First Combustion of Gas Turbine	
Start Commercial Operation	
Complete All Construction	
<b>TRANSMISSION LINE ACTIVITIES</b>	
Start T/L Construction	
SYNCHRONIZATION WITH GRID	
COMPLETE T/L CONSTRUCTION	
<b>FUEL SUPPLY LINE ACTIVITIES</b>	
Start Fuel Supply Line Construction	
COMPLETE FUEL SUPPLY LINE CONSTRUCTION	
<b>WATER SUPPLY LINE ACTIVITIES</b>	
START WATER SUPPLY LINE CONSTRUCTION	
COMPLETE WATER SUPPLY LINE CONSTRUCTION	

# POTRERO POWER PROJECT PREPARATION TEAM

Introduction .....	Marc Pryor / Kevin Kennedy, Ph.D.
Project Description .....	Marc Pryor / Kevin Kennedy, Ph.D.
Air Quality .....	Tuan Ngo, P.E.
Public Health .....	Obed Odoemelum, Ph.D.
Worker Safety and Fire Protection .....	Alvin Greenberg, Ph.D. / Rick Tyler
Transmission Line Safety and Nuisance .....	Obed Odoemelum, Ph.D.
Hazardous Materials Management .....	Alvin Greenberg, Ph.D. / Rick Tyler
Waste Management .....	Michael Ringer
Land Use .....	Jon Davidson, AICP
Traffic and Transportation .....	James Fore
Noise .....	Jim Buntin
Visual Resources .....	Michael Clayton
Cultural Resources .....	Gary Reinoehl / Roger Mason, Ph.D.
Socioeconomic Resources .....	Michael Fajans / Amanda Stennick
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Aquatic Biology .....	Shari Koslowsky / Rick York
Soil & Water Resources .....	J. Crea / D. Brocard / A. Greenberg, Ph.D.
.....	J. Henneforth / M. Krolak
Geology and Paleontology .....	Neal Mace, Ph.D.
Facility Design .....	Brian Payne
Power Plant Reliability .....	James C. Henneforth
Power Plant Efficiency .....	James C. Henneforth

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